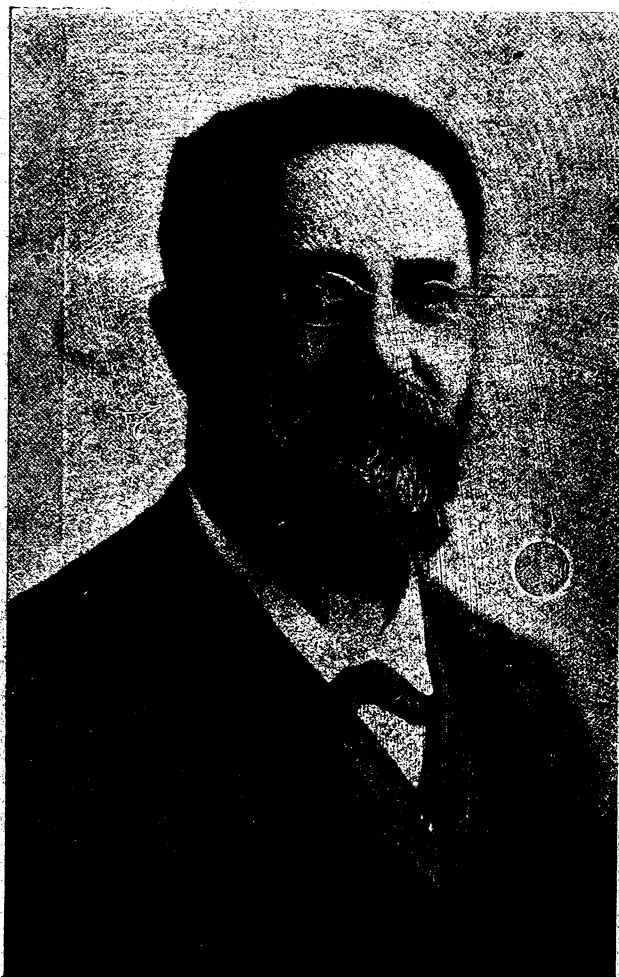
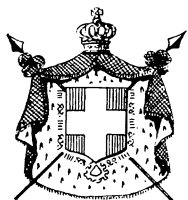


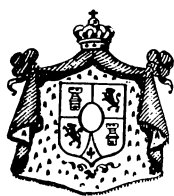
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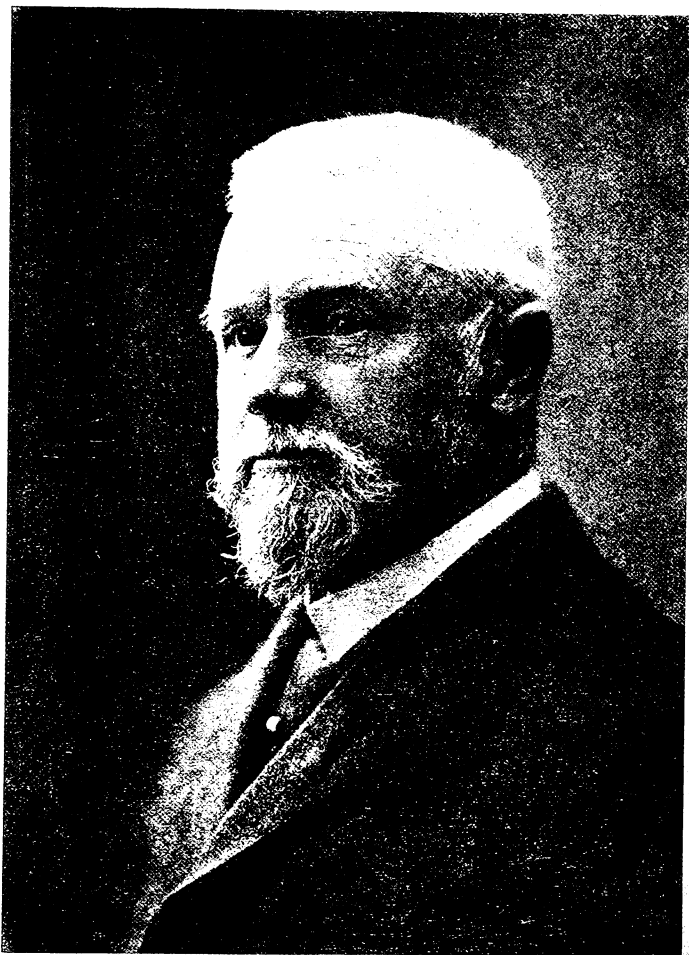
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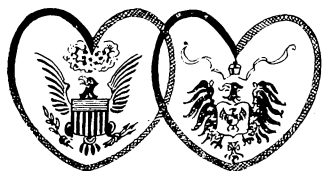
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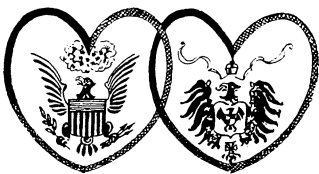


Howell Sill Jenkins





W.D. Miller.





A Study of Epulis.*

By Dr. OSCAR AMOEDO, Professor at the Ecole Odontotechnique, Paris.

Whatever importance may be attached to epulis from a diagnostic and therapeutic point of view, I would not again have touched upon this subject, if, since my communication in September, 1901, to the Congress of the French Society for the Advancement of Science† in Ajaccio, papers had not drawn the attention of practitioners upon this particular point. I therefore refer to my paper for a more complete study of these tumors, the object of this study being only to treat of some distinct points where I disagree with various authors.

Among their number and in the first place must be mentioned Prof. Karl Weisse, dean of the New York Dental College. I shall later on criticize the 1901 thesis of our colleague, Dr. Stepinski.

Views of Prof. Weisse.

Professor Weisse expounded his ideas upon epulis in an article published in the *Dental Cosmos*, September, 1903. After having defined epulis and indicated its frequency and symptoms, he comes to its etiology and says, "Devitalized teeth whose pulp-chambers and root canals have not been emptied of their necrotic contents, and the teeth

*This paper was prepared for the Fourth International Dental Congress, but was not read because of a technicality.—EDITOR.

†See account of A. F. A. S., "*Les Epulis, leur Traitement à leur Dèbut par le Chirurgien dentiste.*"



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treated and filled, and retained roots, are tooth conditions, producing irritation of the gum, or alveolar dental membrane, thereby irritating the neoplasm. It is also possible that in some cases an injury of the gum or alveolar dental membrane may irritate the neoplasm."

We will leave aside points touching upon pathological anatomy in order to consider prognosis and treatment.

Etiological considerations make both necessary, and Professor Weisse advises, in order to avoid these tumors, to extract the roots and have the devitalized teeth treated. "Adjacent roots," he says, "should be extracted and the vitality of adjacent teeth determined. If they contain fillings, these should be removed and the roots treated, if the teeth are found devitalized; care should be taken always not to fill the tooth until the neoplasm has ceased to recur. If the adjacent teeth do not contain fillings they should be tapped, by drilling through the enamel, and the sensitiveness of the dentine tested. If found devitalized they should be dealt with as above stated, otherwise the drill holes should be filled with gold."

Concerning the treatment of non-pedunculated epulis, Professor Weisse advises a real surgical operation, preceding the extraction of the teeth, and a cutting away of the alveolar process. The author advocates cauterization with the crystals of acetate of zinc. These are Professor Weisse's opinions regarding the treatment and etiology of epulis. Now, as this view is contrary to the clinical facts observed by dentists, I believe it my duty to point out what there is wrong in this paper.

In the presence of epulis, should the adjacent teeth be tapped by drilling forthwith? In the disease we are considering, are they always dead, and is it advisable to attack without hesitation an organ that does not present a trace of disease? That seems impossible to me, and moreover, Professor Weisse, himself, in the case he reports found a live pulp. What then becomes of the etiology he is trying to prove?

I have had to treat many patients suffering with this affection and I have never observed any dead teeth in the cases of epulis. When in 1903 at the Congress of Madrid, I presented my report on dead teeth, I did not have to face this sort of complication. Dead teeth cause inflammatory, but not neoplastic complications. This is so general that in numerous cases where I found interstitial caries in molars covered by a fleshy growth from the gum, I could be sure the pulp was alive. If we look at a tooth with a dead pulp and filled, or a dead tooth not filled (mortification from traumatism, for example) we understand the process of reaction to be like this:

The gases developed from the fermentation of the pulp naturally tend

towards the apex of the root. There they may cause an abscess which may be followed by a fistula which will open at a place very remote from the neck, where epulis is rarely observed. I have, on the contrary, arrived at the following conclusion, that, to have epulis, there must be a live pulp.

In fact, the starting point of most epulis is found
Etiology of Epulis. in the alveolar dental ligament. These tissues have a tendency to atrophy as soon as the dental pulp has lost its vitality. These facts and those given at clinics have led me to believe that far from being caused by teeth with dead pulps, epulis appears near teeth whose pulps may be alive.

Perhaps it is not a paradox to say that just as it has been advised to devitalize teeth for the treatment of pyorrhea alveolaris, in the same manner may we be able to prevent a recurrence of epulis, by devitalizing the pulps of teeth, at the level of which these tumors have their origin.

The cases which I report below and which I have selected from a large number, may be considered typical of this class of tumors that evolve without the adjacent teeth presenting any change whatever.

The female patient, the subject of the second case, would certainly not have consented to let one drill through one of her incisors, which did not cause her any suffering. I must say, however, that never for one minute did I think of such an intervention. You will see later, what happy results I obtained to the great satisfaction of the patient.

The etiology of epulis is certainly difficult to prove, but it is less so than of tumors in general, and when our classical treatises are silent on this important subject, and speak only of "neoplasique" diathesis (Verneuil) need we go any further?

It may be said generally, that epulis occurs principally in adults between the ages of thirty and forty and more frequently in women. All local causes of irritation (stumps, the presence of roots in the alveoli) have been named as etiological factors.

Prosthetic pieces with their wires have been justly held responsible by a number of authors. Where we have to deal with fibroma, sarcoma, epithelioma or "chondromes," traumatism certainly plays an important part. Dental origin is indisputable in a considerable number of cases under observation. With reason, also remarks E. Nélaton, that myeloplax tumors are an affection of youth and often of infancy, which ordinarily develop between the ages of fifteen to twenty. As to epitheliomas, their origin is not better known than of cancer in general.

These etiological views, classical and common with all authors, are incomplete in my opinion. They disregard one important point, that is the chemical condition of the mouth. It is known that this region of the



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body is a center, rich in microbes of all sorts; that the secretion of saliva even when normal, constitutes a center of remarkable development for micro-organisms, and it frequently happens that the acid or alkaline coefficient of this center is vitiated. Depositions of tartar are formed and we often blame this tartar as an etiological factor of epulis. We speak here of that serumal tartar which is deposited upon the roots of teeth, and not of the phosphatic tartar that is deposited nearer.

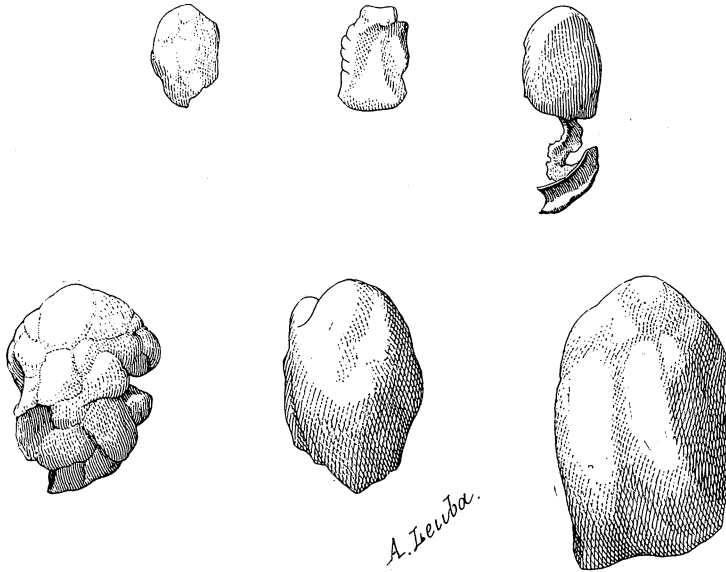


FIG. I

Treatment of Epulis.

What treatment is indicated for this variety of tumors? The ancients contented themselves with cauterizing the tumor with a hot iron (Arab physicians) or to incise it. (Paul d'Egine). During the middle ages, the most ordinary means were always incision and cauterization. In our days recourse is had to more radical means, and rightly so. It is nevertheless useful to remark, that the *modus operandi* must vary according to the stage of development, where epulis is encountered.

In order to make my idea clear, I say again that my paper presented at Ajaccio had the purpose to show that from the nature of his office, the dentist is called upon to discover epulis when it first appears, and that he is qualified to operate upon it then, and with evident success.

I recall that the title of my communication was, "The Treatment of Epulis at its first Appearance, by the Dentist." I have also found too extreme the following conclusions of a very learned thesis on epulis published in Paris in 1901 by Dr. Stepinski. He says:

**Views of
Dr. Stepinski.**

The treatment in all cases must be radical. Excision of the tumor with extraction of adjacent teeth and thorough resection of the corresponding alveolar ridge. Certainly treatment must be radical, but can it not be so without causing serious ruin? Are not the cases which I report the best proof?

I give here, Fig. 1, the reproduction of a series of small tumors, which I have removed, the sizes of which vary from that of a grain of wheat to that of a nut. Is it necessary in similar cases to mutilate the jaw and resect the alveolar ridge? This opinion seems extreme, certainly so, to our dentists.

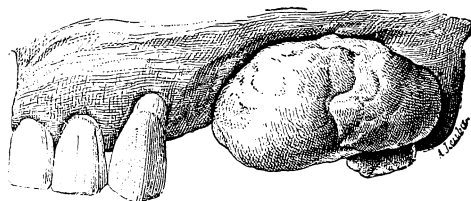


Fig. 2.

Our profession places us in a special position for examination relative to the patient; we can notice epulis at its inception. At this time it is possible to remove it without extracting or even drilling the teeth, without cutting away, as Stepinski would have us do, the alveolar ridges. Recurrence is rare, and I must confess that my daily practice confirms me more and more in this idea.

I must add that many operators have had the same success with identical means and not only with small epulis, but also in cases of extensive tumors. I will cite only the case of Dr. Gaillard, Sr., published in the *Revue de Stomatologie*, June, 1901, entitled, "Cure by means of Ligature of a Voluminous Epulis." The tumor as presented by a man, fifty years old, had the following dimensions. Height, twenty-five millimeters; maximum width, eighteen millimeters; medium thickness, nine millimeters. The removal was accomplished by means of ligature without cauterization, without excision, and without any complication whatever. Two years later, Dr. Gaillard again examined the patient, and did not find a recurrence of the trouble. Ten years later a molar was ex-



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tracted which showed that no relapse had occurred and the gum to be in perfect condition. Now, in this case there certainly was an extensive tumor, and yet the operation was performed with brilliant success by a brother dentist without having recourse to these large incisions and cuttings Dr. Stepinski advises. This case confirms my viewpoint in every way. In opposition to the mutilating treatment of Professor Weisse and Dr. Stepinski, I advise the following treatment:

The Author's Treatment of Epulis.

If the tumor is soft and raw (bloody) that is to say of probably sarcomatous origin, chemical cauterization will be sufficient. For this purpose I puncture the tumor in different directions by means of a platinum wire or wood spatula dipped in a solution of monohydrate chromic acid, taking care to penetrate to the bottom of the alveolus. The mouth must be cleaned previously and the serual tartar covering the

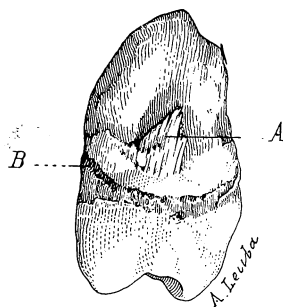


FIG.3

root of the tooth removed. Under the influence of these punctures with chromic acid, the tumor assumes a purplish color, sphacelates, and collapses after two or three days. At this time it is expedient to make another application of chromic acid which may be renewed until the tumor has completely disappeared. The removal of the tartar is one of the important details of treatment. The Darby-Perry instruments, particularly No. 3, may be used with advantage. If after the disappearance of the protruding part of the tumor the gum around the tooth remains red and congested, it is a sign that particles of tartar still adhering to the tooth cause irritation. Often several applications with chromic acid are necessary at intervals of several days, to cause the complete disappearance of this tumor. It is important also to keep the mouth in a state of perfect cleanliness by washings with soap and a solution of permanganate of potash 1 in 4000.

For the hard tumors (*fibromos chondromes*) that do not let the wire or the spatula penetrate, thermocautery should be employed. Care must be taken to go deep into the tumor to destroy its hold either upon the ligament or upon the mucous fibroma; cicatrization must be watched and the fungus destroyed with chromic acid. Even if the tumors, the diagnosis of which is uncertain, is of an epithelial nature, we should intervene; but here the treatment must be even more energetic, and in this case the ignean cauterization of the tumor and adjacent tissues is liable to result in checking the progress of the affection.

At a more advanced stage of the malady, intervention is more complete. The adjacent teeth must be extracted, the bone scraped and very



FIG. 4

deep cauterization with a hot iron employed. The extraction of the tooth by making the alveolar process disappear makes likewise the point of implantation of the tumor disappear. This is a general pathological law which here has a fortunate therapeutic application. In case of a recurrence, or rather when the tumor has attained considerable development, the patient may be directed to a hospital surgeon. The treatment is really no longer one of an ordinary surgical operation, but necessitates special skill which surgeon dentists will do well to consider beyond their sphere.

As easy as it is to incise and cauterize epulis at the beginning, just as dangerous are certain operations upon these same tumors when they



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have invaded a larger surface, liable to recur and beyond the ordinary means of the surgeon dentist.

Mrs. D., age fifty-five, general health good, came to consult me in 1900 for dental caries. She

Cases from Practice.
Case 1. complained at the same time that for two or three years a tumor that was gradually getting larger had appeared in the middle of the upper left jaw. The two premolars, the first and second molars on this side, were missing. The wisdom tooth

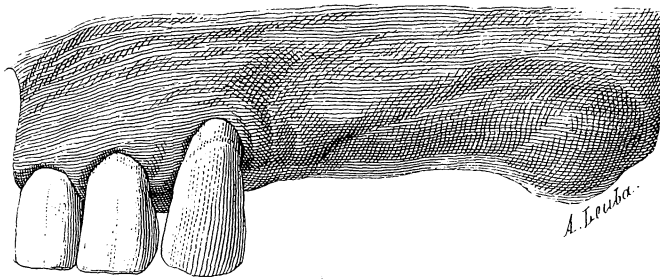


FIG. 5

was in place. At the examination I found in front of this wisdom tooth, and occupying the space of the missing teeth, a reddish tumor scarcely protruding into the vestibule of the mouth, and not causing any deformity of the cheek. The point of implantation seemed to be near the wis-

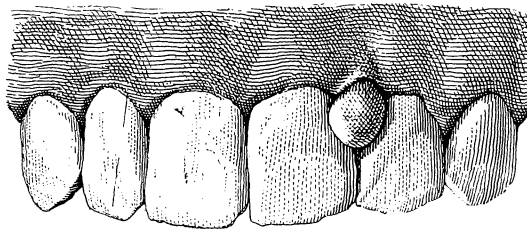


FIG. 6

dom tooth. (Figs. 2 and 3.) The inconvenience was slight and the patient did not ask for treatment. Only after hearing my explanations did she ask to have this tumor removed. After applying cocaine as a local anesthetic, I tried to cut it with a bistoury, but the connections of the epulis with the wisdom tooth made it necessary for me to extract this tooth. I could thus remove the tumor and I cauterized deeply that part of the tumor which was buried in the alveolus. The result of the opera-

tion was good, cicatrization proceeded in a normal way under my constant observation, and at the end of a few days the affection was cured. The histological examination proved it to be an ossifying fibroma. (Fig. 4.) I again examined the patient in 1904, and there had been no recurrence. Fig. 5 is from the model I made some weeks ago.

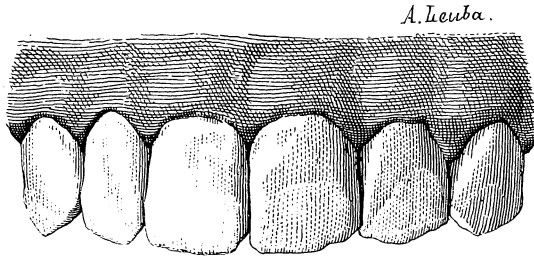


FIG. 7

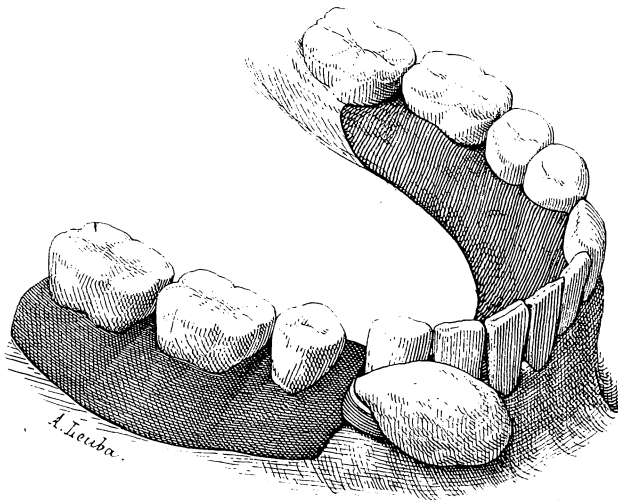


FIG. 8

Case 2.

Miss X., eighteen years old, came to consult me on December 23, 1900, for a small tumor seated on the upper jaw between the central and the left lateral incisors at the level of the neck. (Fig. 6.) At the examination I found a small tumor the size of a pea emerging from the interdental alveolar wall. Having been operated upon by a dentist who had cut it only with a bistoury, the tumor had reappeared. After applying a local anesthetic,



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I cauterized deeply with the galvano cautery. On the following day I had to cauterize with chromic acid and watch the patient. There was indeed between the teeth and the palatal side some fungus which might give cause to a recurrence. I cauterized this point until complete cicatrization occurred. The teeth which had commenced to separate soon reapproached each other. I saw the patient again in June, 1904, *i. e.*, four years after my intervention. The cure had remained perfect as may be seen from the model. (Fig. 7.)

Case 3. Mrs. B., forty-five years old, came to consult me for a tumor on the lower jaw at the level of a prosthetic apparatus. The mouth was in a bad condition, a thick tartar covering the teeth. Prosthetic apparatus replaced the molars on both sides, and were held in place by a wire fastened to the cuspids. At the level of the right cuspid I found a tumor of the size of a thick pea protruding to the outer part of the gum. The pedicle was implanted upon the alveolar wall on a level with the neck of the cuspid. (Fig. 8.) After local anesthetization I cut the pedicle and cauterized deeply with the Paquelin thermocautery. I watched the patient for several days and soon the cicatrization was complete.

Conclusion. Epuli are benignant tumors in general, from the clinical viewpoint, whatever their histological character. The surgeon dentist through frequent inspections of those subjects can notice them from the beginning when the patients themselves are ignorant of their presence. Epulis at this period must be diagnosed by the dentist. Chemical cauterization with chromic acid, cauterization with the thermocautery or galvano cautery are methods of choice he must employ. Removal of the tartar and buccal antiseptics are the basis of treatment. In case the affection is more extended the dentists will send the patient to the hospital surgeon.

Chicago Diploma Mills.

A special interview with Mr. JAMES H. WORMAN, former American Consul to Germany.

On the special train which carried the Eastern dentists to the Fourth International Dental Congress at St. Louis, Mr. James H. Worman, our German Consul, was the constant center of attraction. At all times during the trip he was surrounded by a throng of dentists, who listened with eager interest to the story of his fight against the illegal diplomas which had entered Germany from America. It will be remembered that ITEMS OF INTEREST was the first magazine to expose the fraud which

EXCLUSIVE CONTRIBUTIONS

existed in the licensing board of Illinois. At that time we were criticized in high places for our attitude, but the result has more than proven that our course was right, as today the issuance of illegal diplomas has been practically abolished. This in a large measure has been due to the activity of Mr. James Worman, and we feel sure that our readers will be as interested in reading the following brief account of some of his work, as were the men on the special train when listening to him. It is estimated that this work has cost Mr. Worman personally about five years work and something like ten thousand dollars.

The German-American dentists presented a letter of recommendation of Mr. Worman's labors to the Secretary of State, and the reply reads as follows:

DEPARTMENT OF STATE,

WASHINGTON, June 29, 1904.

N. S. Jenkins, D.D.S., Honorary President, League of American Doctors of Dental Surgery, Munich, Germany:

Sir:—I have to acknowledge the receipt of the letter of the 15th inst. signed by yourself and other members of the executive committee of the Centralverein in Amerika graduirte Doctoren der Zahnheilkunde commendatory of Mr. Worman, American Consul-General at Munich. This letter has been read with pleasure. I am sir, Your obedient servant.

(Signed) JOHN HAY.

Mr. Worman's Statement.

A Diploma in Four Weeks.

In 1899, after I assumed the consulate at Munich, a German dental practitioner named Gumpoldt called on me to obtain a visé for his passport. He declared he was going to America to buy himself an American diploma and doctor title. In America, he said, anything can be done for money. I objected most seriously, and refused to give him his visé. He complained of me to the Foreign Office, and I was advised by the Minister of State to visé the passport, but put the police on his track after his return, which I did. He went to America in May, 1900, and came back in less than four weeks a full-fledged Doctor of Dental Surgery, after having visited the Windy City.

The license he had the effrontery to send to the Consular Office some time in June or July to be certified to as a correct American document. Of course, the Consulate refused; but we made a copy of the instrument, and found that one J. H. Smyser, then secretary of the Board of Dental Examiners of Illinois, had issued such license upon the strength of a testimonial said Gumpoldt was *supposed* to possess.



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My inquiries satisfied me that Gumpoldt never had a certification from Roumania upon which such a license could be issued, and I caused Gumpoldt to be prosecuted in the courts, insisting upon it that he could only have obtained a license had he passed the examination before the Board of Dental Examiners of Illinois.

Mr. Gumpoldt, evidently familiar with "ways that are dark and tricks that are vain," found no difficulty in obtaining at once another license from the same source, although 4,000 miles from Munich, purporting *that he had passed a satisfactory examination and was entitled to practice dentistry in the State of Illinois*. Strangely enough, the license was *three hundred numbers higher* than the previous one, showing that Illinois was manufacturing dentists at such a rapid rate that there would soon be more dentists in Chicago than people.

After contesting the case in court unsuccessfully, a German consul having certified to the authenticity of the documents and to the legal authority of the signers, and other cases of similar character disclosed by Dr. Steinberg, of Nuremberg, having pressed home the fact to me that more than one diploma mill was conducting business in Chicago, and that a flood-tide of licenses and diplomas was likely to overtake Germany—I determined to visit Chicago and find out for myself whether there was any possibility of stopping frauds that threatened national disgrace.

I was invited to visit the National Dental Association, then in session, as well as the other dental bodies convened in Milwaukee, and I told them of the shame that was upon us, and the disgraceful traffic that was carried on in Europe, to the disadvantage of American dental surgery. Not only a respectful, but a most sympathetic hearing, rewarded me for my effort. Money was raised with which to carry on the prosecution. I was assured of cordial support here and in Germany, if I would co-operate with the parties who had been named as a prosecuting committee.

I began my work ere I left the city of Milwaukee, first by seizing upon the archives of the Illinois State Board of Dental Examiners, then temporarily at Milwaukee; secondly by making transcripts of those archives; third by photographing such documents as I believed to be essential evidence in courts of law; fourth by collecting such original affidavits as covered cases of which I had knowledge in Europe; fifth, by withdrawing from the archives several of such blank licenses as had been at various times issued, signed by members of the Illinois State Board without proper authority, and without due consideration of legal and official obligations.

**Discoveries
in
Chicago Records.**

My copies of the minutes and the license book revealed to my utter astonishment clearer evidences of crime and corruption than the proofs I had brought from Europe to substantiate my charges for malfeasance of office against certain members of the Illinois Board of Dental Examiners, so that I felt obliged in order to prevent the destruction of the evidence which these official documents furnished, to photograph certain pages, both of the license and the minute books.

One of the results of this proceeding was that I caused L. L. Davis, the former secretary of the Illinois Board, to be summoned before Senator Quarles, of Wisconsin, in order to have Mr. Davis explain away, if he could, certain entries and changes that I had thus accidentally discovered in the minutes, as well as in the license book.

Mr. Davis, as a former member of the Illinois State Board of Dental Examiners, as well as its secretary, upon my request then made affidavit, duly sworn to before Senator Quarles at Milwaukee, on August 12, 1901, that said Davis did not issue license to one Finley under date of March 21, 1896, because said Finley, according to the records as he had recorded them when he (said Davis) was secretary, had not passed the examinations, and was not one of the twelve successful candidates at that particular session of the Board at which Finley appeared for examination, and that the records had been changed by someone, so that the name Finley had been altered to Tetley, and that the name of C. A. Finley had been entered by someone else than himself as the first party passing the examinations, and that the figures appearing from 1 to 12 before the various names had been placed there by someone else besides himself, and that the twelve names as given were not the names of those who had passed, but only beginning with No. 2 of the names as standing on the minutes up to No. 12, and including a name following No. 12, namely, that of Hayden, were the names he (Davis) had recorded as having actually passed the examination, while C. A. Finley, written above as No. 1, had been inserted by some hand other than his own, was not entitled to stand there—and had never passed the examinations, and was not one of those to whom he issued a license as successful candidate.

With this affidavit—before a prosecuting committee had been organized to be entrusted with the investigation and prosecution of the offences committed in the name of American dentistry in Illinois, either in State or college, I proceeded to Chicago to present this, with other evidence, to the State Attorney, who advised that immediate steps be taken to frame an indictment on the Gumpoldt case, although it would probably miscarry, in order to gain time and work up sufficient evidence in the Finley case.



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it being necessary to obtain Finley as State's evidence to show how the crime against the State had been committed on behalf of said Finley, by someone, in issuing a license to which he had not been entitled by law, nor according to the records of the Board of Dental Examiners of Illinois.

Smyser Indicted. Between the time of the arrest of J. H. Smyser under the indictment framed in the Gumpoldt case, and the time for the hearing of said case, I was charged to see to it that the necessary evidence was obtained from Finley and others to make a second indictment possible at the hearing under the first indictment.

Not only was I able with the assistance of Counsel Knickerbocker, of the prosecuting committee, who had in the meantime been designated to me as a most valuable adviser to obtain all needful evidence in that particular case; but an anonymous communication sent to me during this period of inquiry while residing and working in Chicago, at the Auditorium Hotel, concerning one Igney, also afforded under the efficient labors of Judge Knickerbocker, further evidence of Smyser's criminal course, and the State's Attorney therefore indicted Smyser under seven different counts before Justice Cavanagh, so that at the very moment at which Smyser was discharged in the Gumpoldt case because the evidence obtained was in Germany, Smyser was rearrested and held under heavy bail for the crime under seven different charges.

The tempest in the teapot which I had come to stir up in the Gumpoldt case, according to the defense, proved to be a tempest of a very different nature when these crimes were charged home to Smyser; and the experts in chirography, not only for the prosecution but also for the defense, had conceded that the forgeries committed were in the handwriting of said Smyser, and Smyser, who had feigned innocence, had been obliged to confess under cross-examination that the forgeries were his.

These facts were established just three years ago this month. Mr. Smyser is still under bond on these indictments, and up to this writing, the State of Illinois has failed to execute its laws and bring to trial said Smyser for these serious offenses against the law with which he stands not only charged, but some of which he himself has acknowledged on the stand to have committed.

In the German courts, the statement has repeatedly been made that Smyser has been discharged, and that he has been proven innocent of these offences; and decisions have been rendered by German courts unfavorable to justice, because it has been taken for granted that Smyser cannot himself have acknowledged the offences nearly three years ago, and yet go unpunished for them so many years.

EXCLUSIVE CONTRIBUTIONS

Dr. Crouse's Statement.

At a meeting of the Committee on Legislation in the International Dental Congress, held in St. Louis, August, 1904, Dr. Crouse made the statement to a large body of distinguished doctors of dental surgery convened from all parts of the world, that Illinois is exercising a merciful consideration for said Smyser, because he had been put beyond the possibility of doing harm, and was punished enough by the loss of his health and his practice.

Dr. Crouse did not state how he could harmonize this act of consideration for Smyser with the want of consideration that said Smyser had had for the poor boy Igney, whose \$500 Smyser had taken, and which was all of Igney's worldly possessions; nor what Smyser would have done if he could have convinced the court and the public that he was innocent of the crimes charged against him—and had in turn attacked me for having brought these charges against him. He would certainly have deprived me of my rightful possessions and of my title to honesty of purpose and unselfishness of desire. Dr. Crouse's is a maudlin sympathy, uncalled for in the case of a man who has robbed hundreds of their possessions and has made merchandise of his public trust, to the disadvantage of everyone whom he could bring under his power, and upon whom he could exercise his influence.

Smyser was brought under indictment by the evidence I obtained while still at Milwaukee, and by the evidence I furnished while working at Chicago before leaving the American shore.

I felt satisfied that if the evidence from Germany was insufficient to bring conviction, the evidence I had obtained from the American records and from American witnesses would and should prove sufficient to end the criminal career of those who had abused their official power in the State of Illinois. If these people still go unpunished, the neglect is chargeable not to the want of evidence furnished by me, but to other quarters and to other causes, and it is the duty of the profession to look into this matter.

Mr. Worman Returns to Germany

Returning to Europe, after having obtained in this country sufficient evidence to convince me that great wrongs had been committed in the State of Illinois, I proceeded to induce the courts of Bavaria to send over to America the original documents that gave evidence of the wrong committed in the Gumpoldt case. It was the first instance in which a German court was induced to take such a course to further the cause of international justice.

But lo and behold! while Dr. Reed was willing to give his testimony to the German consul, who had been given a commission, none of the old



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members of the Illinois State Board, who had been summoned as witnesses, were willing to appear to aid the cause of justice, on the plea that they would not come to Chicago unless paid their mileage and compensated for the loss of time involved. So generous were the sentiments, so self-denying the motives of these honorable gentlemen who had not hesitated to say that I had been bribed by the National Association of Dental Faculties and the National Dental Association with the money that had been collected to assist the prosecuting committee in ferreting out crime.

Mr. Pitner, once a trusted member of the Illinois State Dental Board of Examiners, did not hesitate to put his signature to a circular undoubtedly prepared by Huxman, charging me with the crime of bribery and of bearing false witness. Yet Pitner refused to come to Chicago—as well as Jocelyn, formerly on the Board—to aid in bringing to the bar of justice the parties who had aided in issuing and uttering a forgery, such as they must have known the license of Gumboldt to be, their own signatures being attached to these licenses. By their personal appearance before the Consul they could have helped to establish for once and all as fraudulent and unauthorized those documents, and have proven the facts upon which conviction could have been meted out to those who committed the crime of forging the seal of the State, and issuing documents unwarranted by law.

These men, once the trusted officers of the law, knew that I had declared these documents as unauthorized. They had become fully possessed of a knowledge concerning them, and yet in the light of that knowledge which I had given them, they refused either to assist the State in determining the truth about these documents or those concerned in writing them.

Since then the State of Illinois has proceeded against Gumpoldt and others to the number of thirteen, whom I had discovered equally irregular, for possessing licenses issued without authority, and spurious in character.

By instruction of the secretary of the Board, the
The Hofer Case. service in all these cases was performed by the Consulate of Munich, or with the assistance of some by other American consulates in Germany. In some instances, the parties attacked have made answer. Thus, there is Hofer, of Nuremberg, there condemned by my testimony. He possesses two spurious licenses, one of these licenses signed only by *two* members of the Illinois Board, one of these two names being that of Smyser, who issued the document, and it is alleged, made verbal confession to that effect to the German Consulate at Chicago.

Hofer never passed his examination according to the minutes, and

was not entitled to a license. He holds a diploma from the German-American Dental College in Chicago, and obtained his license from the hands of Smyser. Hofer also possesses a second license equally unauthorized. These licenses were in Chicago three years ago. The German Consul offered to furnish them to the Illinois State Board and to the courts, to aid in the prosecution of Smyser, if such evidence could prove helpful, the German courts having sent over for investigation as to their authenticity.

For some unaccountable reason, these original documents were also returned to Germany without due effort to determine how they originated in the office of the Board of Dental Examiners of Illinois, or why they came to be issued by said Smyser to said Hofer.

When Hofer found himself confronted by me in the German courts, he brought to his aid an attorney who had been successful in freeing from the prison bonds a number of German graduates of the two notorious colleges of Illinois—the school of Weil and the school of Huxman. And when I succeeded in bringing about a verdict of guilty, Hofer did not hesitate through his attorney to charge me with the crimes of perjury and bribery.

It is needless to say that I soon convinced the German courts that even the pledges that had been given me of support for expenditures for stenography and typewriting, had not been kept by the prosecuting committee, and that I had never seen one cent of the money collected by the prosecution or by anyone else, and that I had labored without asking for compensation, to cleanse the American escutcheon of the shame that under the law of Illinois had been brought upon us.

**Fraudulent Diplomas
in
Germany.**

Over three hundred fraudulent diplomas exist in Germany. Over seventy cases have been heard in the courts in which I have been called as an expert witness. In over thirty of these cases I rendered assistance without even receiving the compensation which the law allows me. In none of the cases in which an innocent man entitled to the rights of American academic honors has been prosecuted, have I accepted one dollar of compensation, or even one penny of reimbursement of heavy expenditures made on their behalf. In recent times, however, I have not hesitated to charge all that the law of Germany would allow me to do, to the holders of spurious degrees, because they will persist in contesting as rights what they know to be unlawful acquisitions.

**Mr. Worman
is Transferred
to Canada.**

So wide has been my field of activity, so onerous the self-imposed burdens, that I have felt obliged to withdraw from Germany altogether and seek a rest by transfer to Canada. I did not, however, seek this change until I had first presented the rights of the



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reputable American College of Dental Surgery to the courts and to the Government of Germany; and secondly, assured myself of the assistance to both for the rehabilitation in the Fatherland of the American doctor of dental surgery, provided always that the American practitioners in dental surgery, as represented in the various national bodies, shall take such steps as will assure the German Government that fraudulent colleges are stamped out in America—and the laws amended so as to make their resurrection impossible—provided also always that a uniformity of practice shall prevail in the American colleges as to admission, the course of study, and the conferment of degrees, and provided always that no licenses will be issued by any State or college recognized by the body of dental examiners that has not legally met the requirements of the State under whose laws it was chartered.

Competition in Europe.

The American dental profession has not yet awakened to the fact that European competition is growing in strength daily; that the dental profession of other lands is making every effort to wrest from our country the glorious reputation of super-excellence, and that unless steps are taken to insure the measures above indicated, the time will soon come when no foreign student will patronize an American college of dental surgery, and when American dentistry will be as much questioned in Europe, as would be the name of a woman traduced by calumny.

The indifference of the American profession, considering the wrongs that their fellow practitioners have suffered in Europe, is almost criminal. How can we sit by and see those suffer who are the loyal advocates of our good name, and who are facing an opposition as malicious as it is unscrupulous?

Years ago, when the American graduates in Germany first banded together and made the journal of Erich Richter their organ, the name of Huxman became a byword in the mouths of German dentists. Now that these graduates of reputable American colleges in Germany have their own organ, Erich Richter does not hesitate to declare the conductors of fraudulent colleges entitled to the same consideration as all other American colleges; because none of them are more than private business enterprises for personal gain.

In the cases of Gutman and Schuman—so-called diplomés of the German-American Dental College, Richter's testimony went unquestioned; and in another case now pending, the same might have happened if the courts had not deemed it more judicious to make inquiry first of the German Consul in Chicago, and thus learned that the testimony I had given was true to facts, and that Richter had borne testimony in direct contradiction of statements that he had published over his signature in his own



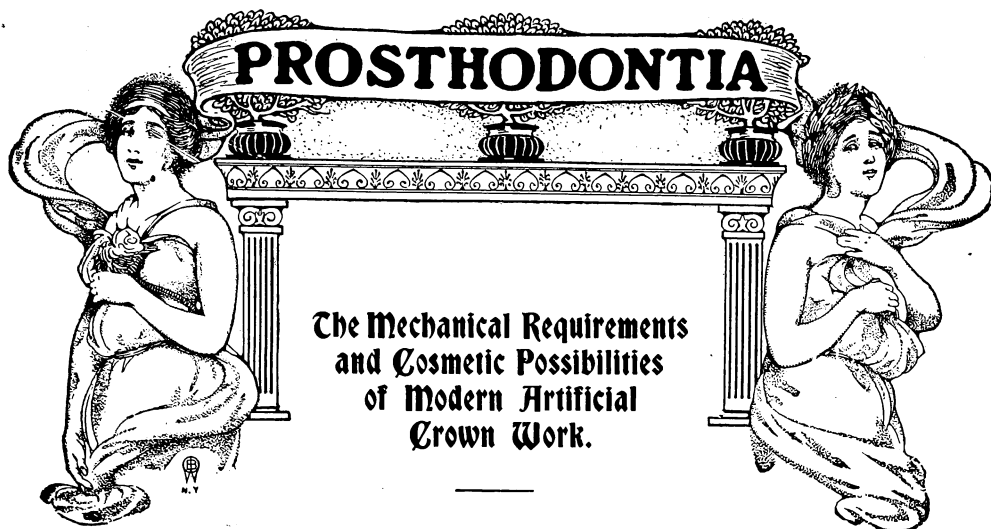
EXCLUSIVE CONTRIBUTIONS

journal ten years ago. (Compare *Journal fuer Zahnheilkunde*, 1890-1896.)

It will prove yet true that eternal justice reigns supreme, and that there is nothing so fine spun under the sun that it might not find the culprit having woven nets of destruction not for others, but for himself. The near future will probably bring revelations on German soil that may force this lesson home to more than one of the culprits in Germany; and I shall not be satisfied until the same justice shall overtake those also who, to the shame of America, have been able to ply their nefarious trade on these shores.

It is most gratifying to me to say, in closing this paper, that the highest judicial authority of Germany as to the laws of doctor title—the chief justice of one of the German states—bears me this testimony: that not only does he recognize that I have performed great service to the cause of justice in suppressing the fraud in Germany; but also that I have rendered inestimable service in establishing the rightful claims of the reputable colleges, and in paving the way for their recognition.





By HART J. GOSLEE, D.D.S., Chicago, Ill.

(Abstract of paper read before the Fourth International Dental Congress at St. Louis, 1904.)

Since it is the very highest achievement of true art to copy Nature, we have contributed liberally thereto by the development of procedures which enable us in our own particular field to so closely simulate Nature in her perfections and imperfections as to be able to substitute the natural with the artificial in such manner as to preclude detection.

Whilst I make the statement that we are now able to accomplish this in a large degree, yet I must also acknowledge with profound reluctance that many of us do not do so, and that still more do not even try. Hence, I find a logical excuse for this effort in the attempt to stimulate others to aid in the elevation of the profession in general, and of dental art and dental mechanics in particular, to a sphere beyond that of the mere artisan, and more in accord with the higher degree of art which modern possibilities offer.

That cosmetic requirements demand the employment of porcelain is acknowledged, and that the mechanical requirements also demand a pronounced degree of strength in the crown, and of stability in the attachment, is also conceded, and yet again how may the composite of these requirements be best obtained?

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Richmond Crown.

An effort in this direction was marked by the advent of the porcelain facing, and its use in combination with gold, and the so-called "Richmond" crown, with its various modifications, was suggested, and is still much employed. While this general style of construction embraces advantageous features in line with both of the general classes of requirements, still it involves detail which is necessarily somewhat circuitous, and possesses disadvantageous features, so pronounced, as to preclude its universal employment.

While the mechanical requirements are perhaps adequately conserved in so far as attachment to and protection of the root is concerned, the particularly objectionable features are that a thin veneer of porcelain can never possess that degree of translucency necessary to closely resemble the natural teeth when it is placed in contact with a surface of metal; and that a maximum degree of strength in its attachment to the metal can scarcely be expected from the simple attachment afforded by the pins.

Ready-Made Porcelain Crowns.

These very objectionable features, when combined with the necessarily circuitous detail incident to the construction of this style of crown, and when further supplemented by the apparently innate desire of an unfortunately large proportion of practitioners to avoid the expenditure of effort and energy as much as possible, soon led to the suggestion and manufacture of ready-made porcelain crowns.

The stupendous sales of some forms of this particular style of crown which the manufacturers have recorded each year since their introduction silently attest to the willingness of a large proportion of the profession to use, and of the manufacturers to supply and to create and increase the demands for, those methods which offer only the advantages of simplicity in application.

In this particular connection is the employment of any ready-made style for immediate adjustment conceded to afford the same opportunities for obtaining a maximum degree of permanency incident to the preservation of the roots of the teeth as is offered by the crown which is skillfully constructed for the special case? Is it possible to secure as close an adaptation between the base and periphery of the crown and root by grinding the one to fit the other, as it obtainable by the burnishing or swaging of a metal base? Is the joint secured by the former procedure as impervious to the penetration of the secretions of the mouth as is the joint which may be obtained by the latter? Do we not depend largely upon the closeness of this joint for permanency in the operation, and are the opportunities for the protection and preservation of the root as favorable by the former method as by the latter?



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My answer to all of these manifestly logical queries is emphatically negative, and I can scarcely believe, in view of the present methods for obtaining a maximum of all of the combined requirements incident to the application of artificial crowns, that the continued more or less extensive employment of ready-made products is indicative of the progress which the profession is making.

Indeed, it occurs to me that the general use of ready-made crowns by the ambitious and conscientious practitioner of today is as deplorable a practice as the employment of the so-called "shot-gun" prescription by the modern physician; and I believe that the sooner the progressive practitioner arrives at this conclusion, and abandons the use of all forms of ready-made crowns—except perhaps in rare instances—the sooner will he be adopting more conservative and reliable methods; putting forth better efforts, and conserving to more permanent results.

As pertains to the class of requirements which have been and are thus designated in the composite as being mechanical, and upon which depend the protection and preservation of the root, and consequently the permanency of the operation, I have already emphasized the importance of securing the very highest degree of accuracy in the adaptation of the crown, and asserted that this essential feature may be accomplished only by conforming a metal cap or base to the exposed end of the root.

Early recognition of this fact led to the construction of crowns with a metal base, adapted directly to the end of the root, and subsequently, to the employment of a cap entirely encompassing a short projecting end. This procedure was advocated as a means of carrying the immediate joint between crown and root to a point where it would be less accessible to the secretions, and thus more immune to their deleterious action, as well as for the purpose of adding increased stability to the attachment between the two, and of insuring greater protection to the root.

The advisability of such a procedure has precipitated much vigorous discussion, and has always been more or less a debatable question, and the fact that it continues to be so regarded by many probably accounts for the extensive use of ready-made crowns.

Hence I maintain that if the periphery of the projecting end of the root is properly and skilfully prepared—a procedure, however, which is usually performed in the most flagrantly perfunctory manner—and then if a *narrow* band made of a gauge of metal sufficiently heavy to retain its given shape under the stress of fitting, is well and closely adapted to the sides of the root, and allowed to pass only a short but uniform distance within the free cervical margin upon all surfaces, so as to closely follow the cervical curvature of the gum, and offer no impingement upon the

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peridental membrane, the presence of a band will offer *no* mechanical irritation, and the objections to this style of construction will thus be largely, if not entirely, removed.

In proportion, then, as these statements seem to be logical, the employment of a band in the manner indicated is practicable and warrantable, and in a large percentage of cases will afford a type of construction which will without question offer the most permanent results. Where it may not be so adapted, however, its employment is contra-indicated, and the adaptation of a simple plate to the end of the root will doubtless offer the next best means of conserving this phase of the requirements.

It would seem that the combined mechanical and
Modern Porcelain Crowns. cosmetic requirements may be best obtained in the large proportion of cases by the employment of facings and the construction of modern porcelain crowns made especially for each case.

The advent and development of porcelain work; the recognition of its possibilities and limitations; the large range of adaptability of the compounds now prepared, and the improved facilities for their employment now at our command, make it possible for every progressive practitioner to achieve results which combine both of these general classes of requirements to the highest possible degree, and to an extent not to be attained by any other modes of procedure.

The special advantages to be obtained from the application of porcelain crowns lie in the artistic manner and facility with which the natural conditions and varying characteristics may be closely simulated, together with the increased possibilities for securing a degree of strength exceeding any other style of construction. For these highly important reasons I beg to submit that the construction and application of porcelain crowns is destined to become the universal, if not the exclusive, practice of the future, as applied to restoring the ten anterior teeth.

The Rationale of Materials Used in the Construction of Dental Base-Plates.

By R. C. BROPHY, M.D., D.D.S., Chicago, Ill.

(Abstract of paper read before Fourth International Dental Congress at St. Louis, 1904.)

It is proper that we should first consider the properties which a material should possess in order to be physiologically compatible.





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Conductivity.

I believe that a material to be compatible to animal tissue when fixed in contact with those tissues as a base-plate is fixed, first of all must be a ready conductor of heat, and must be of low specific heat. This to my mind is the characteristic of paramount importance from a standpoint of physiology.

There can be no restriction of the radiation of the body heat without a physiological effect, and, I think that it will be admitted by physiologists, that beyond a certain limit restriction of such radiation cannot maintain without pathological effects.

The upper base-plate, particularly, when perfectly adapted to the superior maxillæ, is held in contact with the tissues upon which it rests, through complete exclusion of the air from beneath it. We are told that plates are held in position by capillary attraction, but, inasmuch as there can be no such thing as capillary attraction in the presence of the atmosphere it has always been a question, with me, whether it would not be fully as proper, at least, to term the force which retains plates in position atmospheric pressure. Atmospheric pressure certainly exists whatever other forces are exerted.

In a paper read by me before the Chicago Dental Society, November 15, 1899, and published in the *Dental Review*, Vol. 13, No. 11, I reported experiments I had made to determine heat transmission, or conductivity, and specific heat of vulcanite, and of metal. These experiments showed that vulcanite conducted heat very much slower than did the metal used, which was aluminum; I have made use of that metal because of the fact that it approaches vulcanite more nearly in the matter of cost than any other metals in use for the purpose of making plates, and because of the fact, consequently, that it makes invalid the argument that the cost of metal plates disbars them from general use.

Knowing then that vulcanite—and what is said of vulcanite may also be said of the other vegetable compound, celluloid—is a very much slower conductor of heat than the metals, and the further concomitant fact that it absorbs and retains heat to a greater extent, or is of much higher specific heat, and knowing that as a result of these physical characteristics the tissues which are held in contact with them are constantly maintained in a super-heated condition through excessive prevention of normal radiation of the animal heat through them, we may well conclude, it seems to me, that the unquestionable fact that in the great majority of mouths in which these plates are worn the underlying tissues are found to be in a pathological condition, is convincing evidence that this lack of conductivity is very largely, if not wholly, the cause of such pathological condition.

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Toxicity.

Placing conductivity, then, first as an essential to physiological compatability of dental base-plates, I would name as a second essential quality freedom from constituent substances which might, in any way, exert toxic influences upon animal tissue when in contact with them, or, indirectly by chemical action upon the animal physical economy. It is known that the metals are free from constituents, and that those we may, or would use for base-plates, are free in themselves of such chemical action; while it is also known that in the vegetable compounds used the qualities do exist which yield such influences.

Hygiene.

In the characteristic of dental base-plates materials which come next for our consideration, hygiene, a very important connection exists with the quality of physiological compatibility just considered.

An unhygienic base-plate cannot be physiologically compatible. Nature rebels against uncleanness. Give us absolute cleanliness, a perfect hygienic condition, and bacteria are repelled. Uncleanness in some form or another is the precursor of practically all disease.

What qualities in the base-plate are essential to hygiene? First, the material of which the base-plate is made should be solid and dense, and its surface should be capable of receiving, and should receive a smooth finish and polish, in order that there may be no mechanical retention of substances coming in contact with it, and it should be made of material for which the oral secretions have minimum affinity.

The metals, only, possess these qualities to an extent desired. Not only do the vegetable bases not possess them, but, through the application of the heat to which they are subjected when in the mouth, latent odors are brought out, and, through association with odors thrown off by the fermentative processes of the secretions within the mouth, they are intensified to an extent approaching very nearly the limit of obnoxiousness.

A New Anchorage for Partial Dentures.

By F. E. ROACH, D.D.S.

(Abstract of paper read at the Fourth International Dental Congress, St. Louis, 1904.)

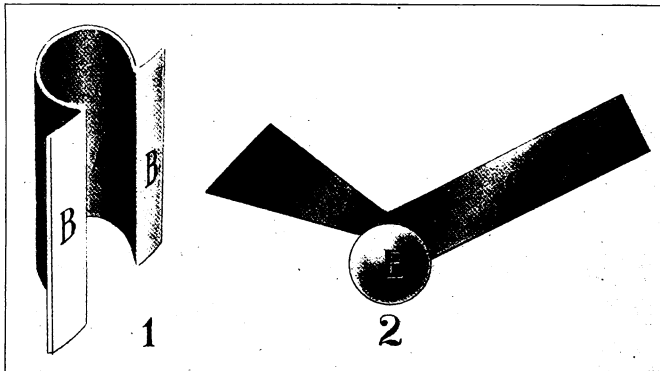
In spite of many objectionable features possessed by the removable denture, it is in my opinion preferable for sanitary reasons if for no other. But in addition to the ideal from a hygienic standpoint may be mentioned greater possibilities of restoration of lost tissues, more artistic effects, facility with which repair can be made in case of breakage and simplifying any subsequent work that may become necessary upon the adjoining



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teeth. These advantages apply to all removable dentures, and if in addition we can add other advantages, and at the same time eliminate some of the more serious objections to the other attachments we have made an advance in the right direction. This I believe I have accomplished in the system herein described.

Briefly the parts of the attachment may be described as follows: The female part comprises a round tube having an open side or slot extending throughout its length, the edges of which are turned back at right angle. This part of attachment is made of 22k gold or iridio-platinum. The male part is composed of two plates of clasp metal so shaped that a split



ball with two projecting stems is formed. Each half of the ball is offset slightly, thus forming a space which permits the two halves closing together when forced into the tube which is made the size of the ball when closed. The longer stem is intended for attachment to the denture. The shorter one projects upward through the tube and serves the purpose of closing end of tube, prevents lateral movement in cases which include but one side of the jaw and overcomes the lifting at the heel of partial plates or any case having anchorage at one end and the other end free.

The advantages of this attachment may be summed up as follows:

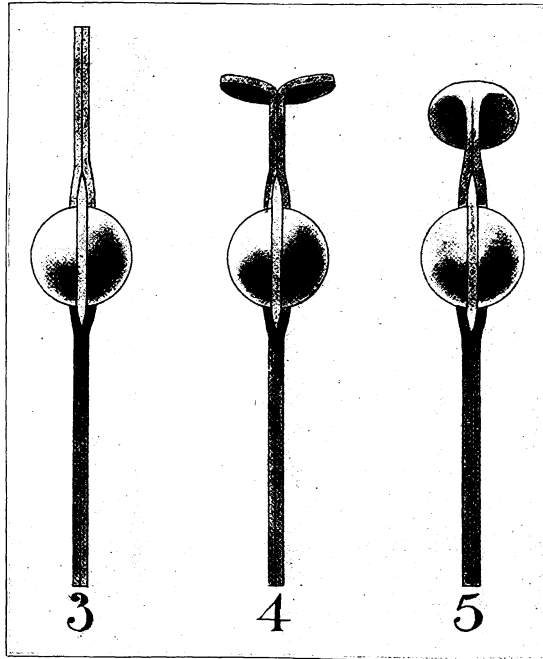
1st. There is no necessity for absolute paralleling of tube or female parts. The male part of attachment being ball shaped, will slide readily to place though the tubes be set at varying angles. This feature obviates the use of jigs, simplifies construction very materially, and overcomes one of the most serious objections to all of the attachments in class two.

2nd. The breakjoint removes leverage from anchor tooth. This very desirable feature alone is valuable when any number of teeth are to be attached back of the anchor tooth. A typical case of this class is one requiring all of the teeth back of the cuspids. In the lower jaw

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these cases are very difficult. In the upper we may obtain reasonably good results with the so-called suction plate, but in the lower there is but little adhesion, and the conical shape of the cuspids makes successful clasping in most cases almost, if not wholly, impossible.

3rd. The attachment is but little in the way of adjustment of adjacent teeth in the denture when tube is placed outside of crown, and when inlaid



it is absolutely out of the way, even though placed directly in line with contact point.

4th. The elimination of leverage permits of anchorage in gold or amalgam fillings, gold inlays or cementation of split ball into sound vital teeth.

5th. The denture need not come in contact with the natural teeth at any point, an advantage at once apparent to every one who has observed the damages resulting from partial plates as they are usually made.

6th. The ease with which the attachment may be tightened; with the blade of a penknife the wearer can spread the ball and secure any degree of tension required.

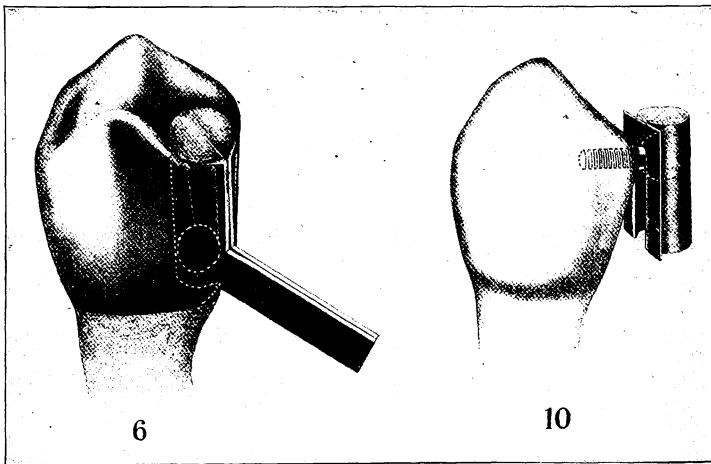
7th. Avoidance, in many cases, of plates extending from one side of the mouth to the other and especially in the lower jaw.



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Further description will be made by reference to models and drawings. Fig. 1 is a side view of tube or female part—(a) is slot (b) is flange. Fig. 2 shows side view of male part of attachment—(c) is stem for securing to denture (d) is stem which projects up through tube, the purpose of which has been explained above. Fig. 3 is end view and Fig. 4 is same view showing how ends of short stem are turned at right angles in fitting to tube.

Of the various means of securing the tube to the anchor tooth the gold crown will probably be the one most used because of easy construction, and the feeling of greater security that prevails in the minds of the ma-



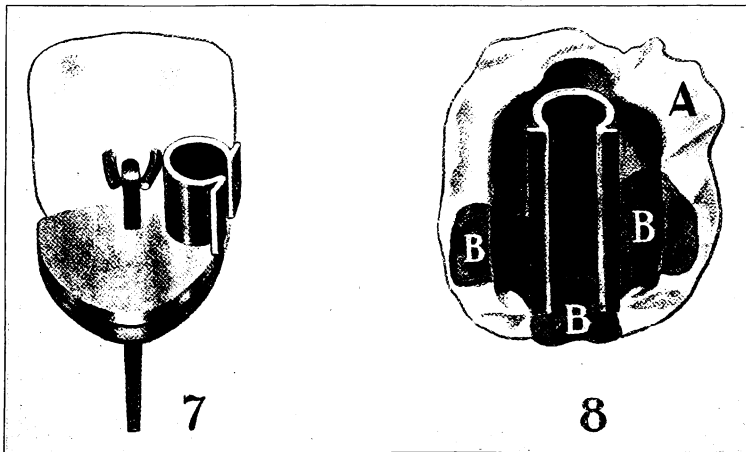
jority of the profession, and for that reason we will describe its use in this connection first. Usually the tube can be inlaid into the crown entirely, and whenever possible would recommend this method, though the tube may be only partly inlaid or it may be soldered on outside of crown. The procedure in construction is as follows:

After crown is made a slot just large enough for the tube to pass through should be cut, (Fig. 5) tube set in place and soldered so that when finished the crown will present normal contour and continuity as shown in Fig 6. Should the tooth to be crowned be a vital tooth that will not permit of cutting the groove, which is necessary for the accommodation of the wholly inlaid tube, a compromise may some time be called for and the tube only partly inlaid. In no case is it necessary to set tube entirely on the outside of crown, but should such a procedure be

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found easier, it may be done with satisfactory results, provided it is set slightly to the lingual (Fig. 7.) When tube is soldered on outside of crown it should be reinforced with solder between flange and crown so that it will not spread when male part is forced to place. The tube in all cases should be so rigidly encased that it will not yield to the spring of the split ball.

This attachment is admirably adapted to porcelain construction. In making porcelain crown with tube inlaid, the procedure is as usual except that tube is adapted and waxed to place with the facing and invested so that they may be soldered at the same time. Body is packed around tube,



baked and finished in the usual manner. A heavy iridio-platinum tube is best for this purpose, and when reinforced with platinum solder is sufficiently rigid to overcome any tendency to cleavage of porcelain around tube. Fig. 8 shows relative position of cope, facing and tube. The same applies to the Richmond except that facing has backing.

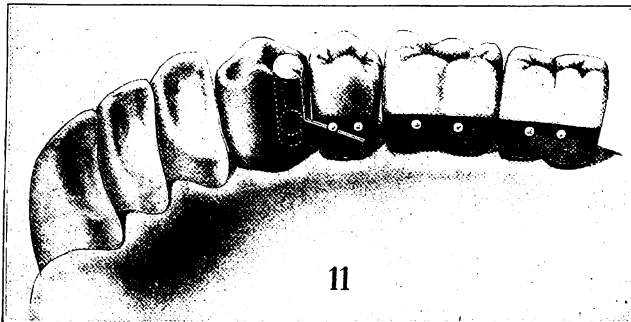
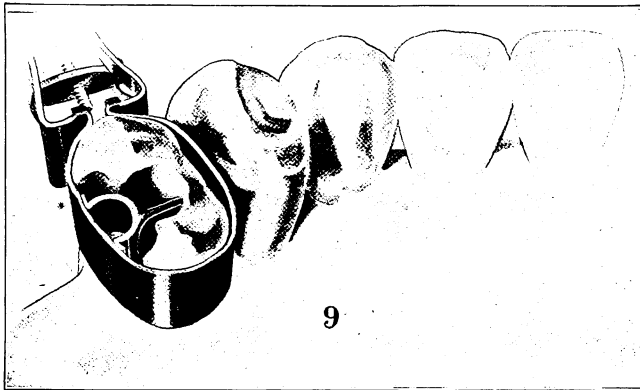
To those familiar with gold inlay construction many cases will present in which this attachment can be used with eminent satisfaction, and at a great saving of tooth structure. At first though this means of anchoring the tube would seem hazardous, but a careful study of the comparative strain exerted upon the anchor with this and other attachments will reveal a great difference in favor of this method and a justification of its employment in a great number of instances with the gold inlay in preference to the gold crown. Thereby the natural tooth crown may be used. Many methods of securing the proper position of the tube in the inlay have been



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tried and the following is suggested for simplicity and accuracy. After the matrix is fitted to the cavity the tube, with a piece of about forty gauge pure gold plate soldered to bottom, is positioned in the matrix while in the cavity and the surplus ends of gold plate is burnished into contact with the matrix in two or more places. The tube and matrix are now removed separately, readjusted to their relative position and soldered. Fig 9 shows this feature.

The tubes may often be securely anchored in gold or amalgam fillings where care is exercised in selecting the cases, and making the fill-



ings. The procedure is practically the same for each. A spur of wire should be soldered to back of tube so that it will be well down into cavity, and rests against side opposite tube when it is in line with contour to be restored. The matrix is now adjusted and tightened until tube is held securely in desired position. The material, either gold or amalgam, may now be packed in around tube and finished in the usual way. Fig. 10 shows adjustment of tube ready for filling.

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Another means of making attachment to sound vital teeth is shown in Fig. 11. In this method the parts are reversed, the male part being attached to the tooth and the tube to the denture. The male part used in this case is the special which is intended for porcelain work. It is a straight round pin having the split ball on one end and threaded at the other. A drill and tap to correspond is used for making hole in tooth and the pin is secured and cemented to place. For cases having one end free this method is not so satisfactory as those previously described, but in many cases it will prove to be valuable.

A combination of the gold inlay and pin anchor is occasionally indicated. This form of making the anchorage will usually apply to small or saucer shaped cavities, in which sufficient retention is not obtainable. I deem it unnecessary to go into details of constructing such an inlay.

For the anchor into the root my method differs from the tube and split pin method now in use in that it permits of ready adjustment to roots of varying angles. This is accomplished with the friction ball and socket joining of the pin to the denture. The advantage of this feature may be seen at a glance. Fig. 12 shows where it may be used to advantage. This form of attachment is especially valuable where economy must be taken into consideration. A simple case in vulcanite will serve to illustrate its simplicity and economy. Take any case where a number of teeth are to be supplied, and one or more teeth require crowns. All that is necessary is the adjustment of tube with cope to root, and the crowns may be supplied as a part of the denture.

In conclusion I desire to again emphasize what I consider the two most important features in connection with this system, viz., conservation of the natural teeth and oral hygiene.





Determination of the Normal Arch and Its Application to Orthodontia.

By C. A. HAWLEY, D.D.S., Columbus, Ohio.

(*Abstract of paper read at the International Dental Congress, St. Louis, 1904.*)

In considering cases in orthodontia where the teeth are malposed and the form of the arch consequently distorted, the question naturally arises, "What is the proper arch for these teeth?" If they are normal and uniform in size, there must be some particular arch for them which they will exactly fill and its form and the position of the contact points and occlusion be correct. Heretofore the judgment of the eye trained by observation of what seems to be the most perfect specimens of nature's work, has been the only guide, but human judgment of this kind is apt to err and the object of the investigation described in this paper is to find some data that will be accurate and exact and form a trustworthy guide.

Dr. Bonwill, in his valuable work on the articulation of the teeth and the movement of the jaws in mastication, outlined the geometrical principles on which the movement of the jaws are based, and the form of an ideal arch. This arch is constructed upon the equilateral triangle and with slight modifications has been universally accepted as correct and forms the basis of the most advanced teaching on this subject. It is shown in the familiar illustration (Fig. 1) the base A A representing the distance between the condyles, the apex of the triangle resting between the central incisor teeth at the cutting edges. The six front

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teeth are arranged in an arc of a circle the radius of which is determined by the combined widths of the central lateral and cuspid teeth. From the distal point of the cuspid, the bicuspid and molars are arranged in straight lines passing to the extremities of the base of the triangle, the points of the buccal cusps being cut by the line. The line drawn through B passes through the middle point between the buccal cusps of the first molar teeth. In commenting on this arrangement of teeth, the author of the article on the subject in *The American Text Book of Prosthetic Dentistry*, from which the drawing is taken, says, "In natural dentures the second and third molars are turned slightly toward the median line and the line drawn through B

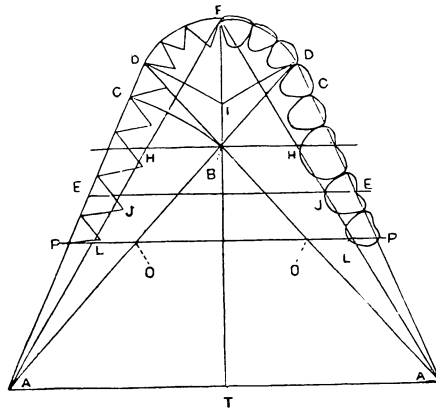


Fig. 1

more often passes through the crest of the disto-buccal cusps of the first molars."

These modifications are, I think, generally accepted as correct.

In the practical application of this form of arch to the arrangement of artificial teeth, Dr. Bonwill constructed an articulator upon the basis of a four-inch equilateral triangle, this being found the average width between the condyles in an examination of a great number of skulls, the width varying from three and one-half to five inches. The casts were mounted on this articulator in such a manner as to copy the form of the natural denture. In setting the teeth, the centrals, laterals and cuspids, were arranged in the arc of a circle, the radius of which was determined by their widths. The bicuspid and molars were carried back in a straight line not exactly to the base of the four-inch triangle represented by the articulator, but moved inward or outward to bring the stress of mastication as nearly as possible over the ridge, and still preserve the



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proper lateral movements of the jaw as represented by the articulator. The exact width between the molars is thus determined by the judgment of the operator or the conditions or position of the ridge. Unless this were done, narrow teeth arranged in a four-inch triangle would be too wide in the molar region and, *vice versa*, wide teeth too narrow.

In orthodontia we meet a different problem. We have presented a set of teeth to rearrange in the living subject. We can determine the exact widths of the teeth. There is no means of measuring the width between the condyles with any degree of accuracy, and we cannot place them in the average arch based upon the four-inch triangle. The arch must be found from some other data and we will select the front teeth.

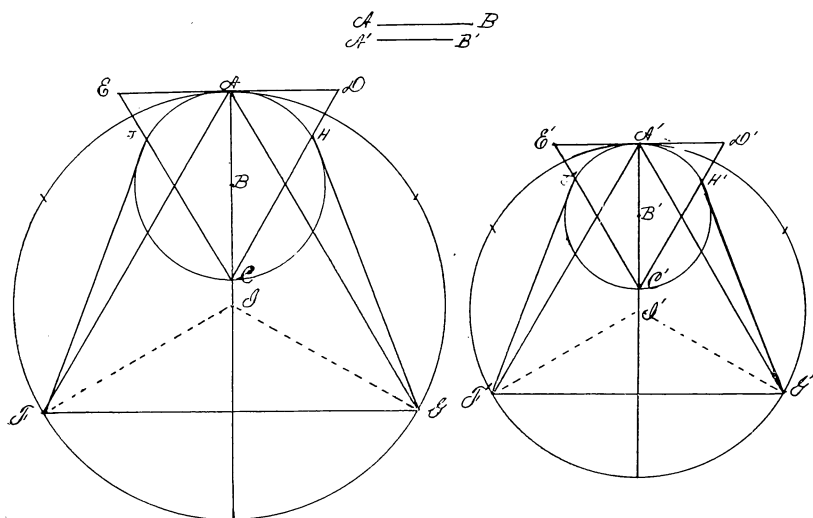


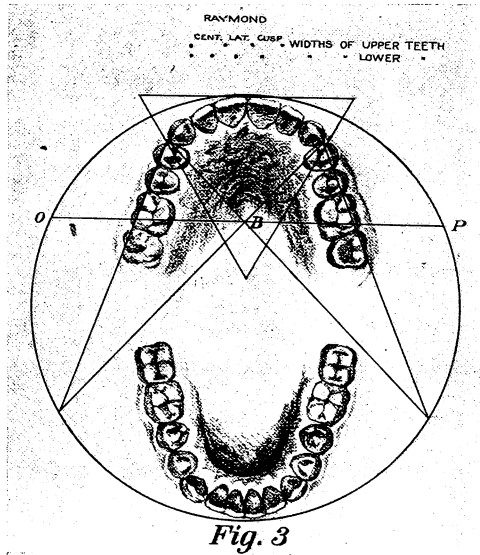
Fig. 2

Take as an example any case and from the combined widths of the central lateral and cuspid as a radius, draw a circle A H C (Fig. II). Measure the radius upon the circumference of the circle at H and J, marking the distal points of the cuspid teeth. From C the end of the diameter of the circle, drawn through A and B, draw the lines C D and C E through H and J, extending them indefinitely. Draw a tangent to the circle at A cutting these lines at D and E forming the equilateral triangle C D E. Take one side of this triangle as the radius of a circle passing through A with the center I upon the extension of the line A C. From A mark off the radius of the circle upon the circumference six times and draw the inscribed triangle A F G. Draw the lines F J and

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G H. We have now an arch based upon and arranged with an equilateral triangle, but proportional to the widths of the three front teeth or the radius A B.

To prove that such diagrams will always be similar and proportional to the radii, from the radius A' B' draw another diagram supposed to represent a smaller set of teeth. In similar triangles the corresponding dimensions are always proportional. The triangle C D E and C' D' E' are similar because they are both equilateral. They are constructed upon altitudes A C and A' C' equal respectively to twice the radii of the circles A H C and A' H' C'. Therefore, the base E D is to the base



E' D' as the radius A B is to the radius A' B'. But E D and E' D' are by construction equal respectively to the radii of the circles A G F and A' G' F'. From the centers of the latter circles draw I F, I G, I' F' and I' G'. The triangle I F G and I' F' G' are similar since they are equiangular (A F G and A' F' G' being equilateral triangles). Therefore F G is to F' G' as I G is to I' G' or as E D is to E' D' or as A B is to A' B'. Or if the arch presented is an ideal one we may from any widths of teeth given construct a similar arch proportional to the given set of teeth.

Having the arch drawn, the teeth may be laid off on it, with a pair of dividers from measurements on the plaster model, thus locating their ex-





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act positions as shown in Fig. III. In this figure, the widths of the teeth are marked above the arch. They are actually marked by needle points in the paper, but here are inked in order to show better in the photograph. In measuring off the front teeth, there is a small space about one-thirty-second of an inch between the cuspid and first bicuspid. This is because the widths of the teeth are taken in a straight line and are measured off on a curve. Notice that the line O P passing through B parallel to the base of the triangle, passes through the crest of the disto-buccal cusps of the first molars. I have found this true of every case that I have drawn. Variations in the proportional widths of the bicuspid might cause it to vary slightly, but I have not yet found such a case.

The second molars are turned slightly toward the median line. The lower arch is drawn from measurements of the lower teeth.

Spreading the Maxillae Versus Spreading the Arch.*

By RODRIGUES OTTOLENGUI, M.D.S., New York.

(Abstract of paper read at the Fourth International Dental Congress, St. Louis, 1904.)

One of the most important movements in the regulation of malposed teeth is the so-called widening of the arch. Formerly, in nearly all crowded dentures, the requisite room for rearrangement seemed to indicate a lateral widening, usually in the bicuspid region, and this was the common course of procedure. Today much of the space demanded may often be obtained by the distal movement of molars, and even of molars and bicuspid, thus giving the desired opportunity for torsion and rearrangement of the anterior teeth.

In both procedures the same principal underlies, and I beg to call especial attention thereto. The additional space is obtained along an imaginary line which bisects the incisive edges and occlusal surfaces. In one instance this imaginary line is stretched laterally, and in the other it is prolonged at each extremity. In both, the teeth are moved in their sockets. This entails two very objectionable features. The molars and bicuspid are loosened in their sockets and can never again afford the same stability as anchorage for final retention, as where similar results are obtained with-

*This paper is published almost complete by request of several orthodontists, who desire to see it in print early, and by special permission of the editor of the *Dental Cosmos*.—EDITOR.

out disturbance of their sockets. A greater difficulty obtains where the teeth are erect at the outset. The widening often results in a buccal slant which precludes the immediate possibility of perfect occlusion. In a great many reports of cases from practice, shown in the past, I have noted otherwise perfect results marred by the outward tipping of the first molar. * * * It is frequently an unavoidable result of using the first molars to carry anchor bands, where widening of the arch is coincident with the application of force in many places at once for the torsion and rearrangement of malposed teeth. It is noteworthy that this buccal tipping of the molar is most common in the upper jaw. The reason is, that the two buccal roots offer more resistance to the force than does the single palatal root. Thus, the buccal roots act as a fulcrum, while the conical shape, and the slant of the palatal root allows that root to be withdrawn from its socket, so that the tooth tips buccally and at the same time is slightly raised, thus opening the bite.

It is the present fashion or fad to deride the use of plates. There is much that might be said, and perhaps which should be said against the dogma which entirely discards the use of a roof plate. But at present I shall speak of the plate only as an instrument for attaining with certainty and despatch a much-desired result, which, so far as I know, has been only occasionally obtained by other means.

In a discussion of this general subject before the Chicago Dental Society, February, 1893, a report of which will be found in the *Dental Review* of March of the same year, Dr. Black is reported to have said that he often undertook to widen the arch by opening the suture using a so-called Coffin plate, with a jack screw, and he fully explains the advantages of this mode of procedure; but he adds: "I have done this in a number of instances with the happiest results. * * * But you cannot do it in every case, and should not try it except with young patients."

**Method of
Opening the
Maxillary Suture**

I shall have the honor to present for your consideration a method by which the maxillae may be spread, by opening the suture practically in all cases. While, of course, the disarticulation of bones is more readily accomplished in early youth, the force which is employed is so irresistible that the result may be consummated in practically all cases where the services of the orthodontist would be demanded. Moreover, the method is certain, swift and painless. No teeth are loosened, the two halves of the bone being moved bodily apart. It is the only method known to me which immediately stretches the imaginary line of the arch above mentioned, *at its center*, thus supplying the added space for tooth movement, just where it is most required.



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While I have been using this method some ten or fifteen years (or perhaps longer), unfortunately, for reasons which need not be here given, my collection of models is less than two years old. I have chosen, therefore, a single case, upon which I was engaged when promise of this paper was made to the chairman of the section, and with this one record I will endeavor to indicate the advantages of the procedure, after which I will describe the technique.

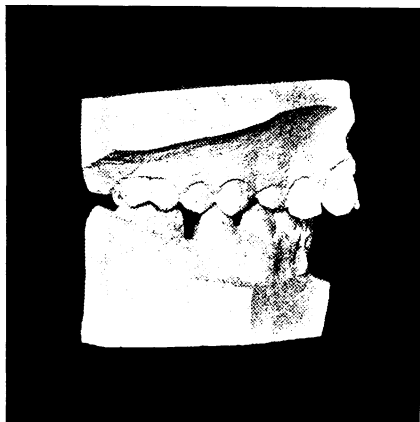


Fig. 1.

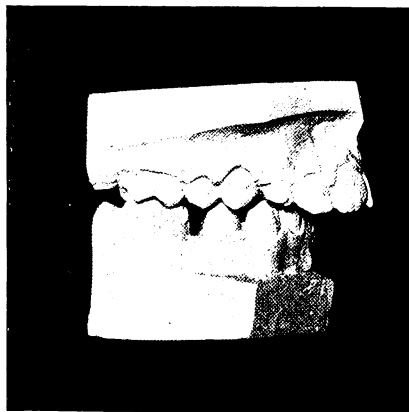


Fig. 2.

Case from Practice.

Fig. 1 shows occluded models of the case as presented. I have chosen this side for illustration because it is the more interesting. A casual glance would indicate that the molars are in true occlusion and that the prognathism is very great. Closer scrutiny shows that the temporary molar evidently was lost prematurely, and thus the second bicuspid is imprisoned through the forward tipping of the molar and the backward movement of the bicuspid. A study of the profile shows that the protrusion of the upper incisive region is not great, while the retrusion of the chin is quite marked. Diagnosis, therefore, indicates a spreading of the maxillae to widen the arch and release the lower jaw, and a distal movement of the lower molar, with mesial movement of the first bicuspid to release the second bicuspid, which an X-ray showed to be buried deep in the jaw, scarcely more than the tips of the cusps appearing in the skiagraph.

The apparatus for spreading the maxillae was applied and two weeks later this part of the work was completed. Fig. 2 shows the occlusion after the spreading, though the models would show to better advantage.

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A close scrutiny of the picture will show shadows under the upper cuspid and bicuspid, indicating that they may now extend laterally beyond normal occlusion. Fig. 3 shows the occlusion when the jaw is moved forward, as in "jumping the bite." The aforementioned shadows disappear, showing that the upper jaw is now wide enough to receive the lower in its forward pose. The malposition of the lower bicuspid and molar prevents proper occlusion and now we see most distinctly that the molar must be moved

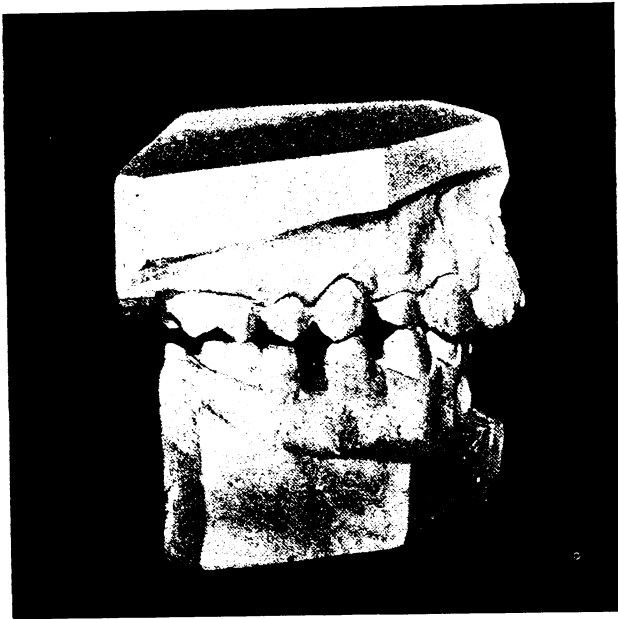


Fig. 3.

distally, the bicuspid mesially and that with the lower jaw brought forward the upper protrusion is not great, verifying our diagnosis. I would also call attention to the fact that at this period there was no buccal tipping of the upper molar. In Fig. 4 we see the upper protrusion corrected, occlusion perfected, and space gained for the lower second bicuspid. A day before I left New York, and two weeks after these models were made the lad reported to me and I had the satisfaction of seeing the tips of the erupting bicuspid. In this figure I call attention to the fact that the molar is now slightly tipped buccally. This is due to the fact that Angle bands and intermaxillary force was used while reducing the upper prominence, and, in spite of the fact that no further widening of the arch was required, still the spring of the arch band was sufficient to cause this slight tipping.



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Consequently, I have banded the bicuspid as supports for a retainer which is to be worn during the summer, thus leaving the molars free to return to proper occlusion, which I have no doubt will be as good when I see the case again as it was at the outset (see Fig. 1).

That you may thoroughly comprehend the alteration of the shape of the upper arch, I show you the palatal aspect of the upper jaw. Fig. 5

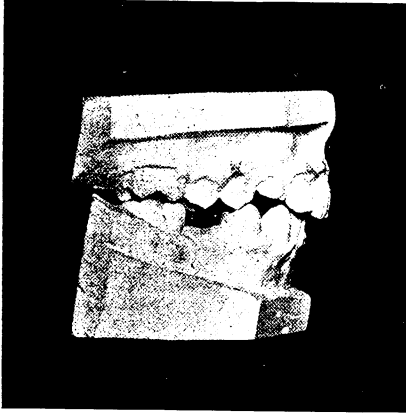


Fig. 4.

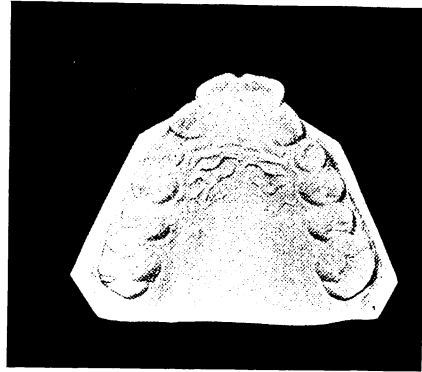


Fig. 5.

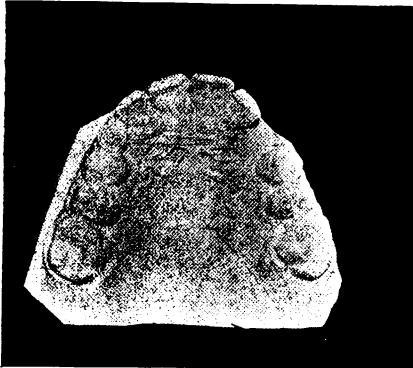


Fig. 6.

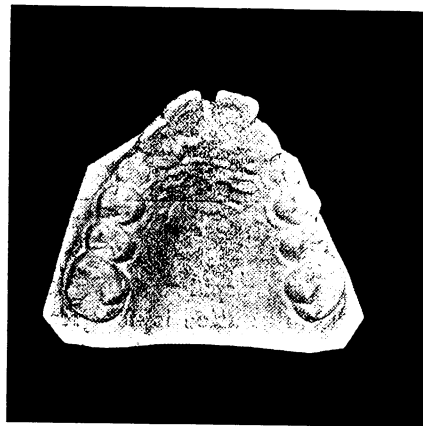


Fig. 7.

shows the condition at the outset, and Fig. 6 the present condition. The temporary cuspid in the interim has been shed. Fig. 7 shows the jaws spread, two weeks after starting the work, the opening of the suture being indicated by the space between the central incisors. Usually, the application of the instrument is such that the suture is opened, as we open a pair

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of scissors, the greatest widening being at the median line between the incisors, *which is exactly the reverse of the action or tendency of the arch band.* The latter exerts its greatest force across the molar region, where it is usually least needed, and the widening of the bicuspid and other regions depends upon additional traction applied to individual teeth. By the method here presented, as I have said, the suture usually opens widest anteriorly, but in the case shown measurement of the models prove that the suture was widened almost equally throughout, probably due to the youth of the patient and the loose character of the articulation of the bones.

The Coffin Plate.

The use of the Coffin plate, with spring attachment, is familiar to you all. Another form of split plate exerts force through the medium of a jack screw. I believe that jack screws of today are better in shape and smaller in size than those of fifteen years ago, but as it is nearly that long since I have had recourse to one for widening an arch, I cannot say what may or may not be accomplished with the newer forms. When I first undertook orthodontia, I found the Coffin plate and spring most unsatisfactory in my hands. I made frequent use of the split rubber plate with the jack screw, and in one case having fortuitously opened the suture, I quickly noted the tremendous advantage gained, and set about discovering a means of doing so at will. My experience with jacks was similar to that quoted from Dr. Black. Success attended occasionally only. Theoretically the split plate presses against the sides of the arch. Practically this is not true except as noted by Dr. Case (*Dental Review*, March, 1893), where the arch is narrow and the vault high. The plate is called a split plate, but really it is only split part way, the slight connection serving both to keep the plate in position and as a hinge. An analysis of the action of this plate with screw pressure will prove that as soon as force is exerted, the rigid character of the hinge causes the plate to leave the actual surface at the summit of the dome, while the slanting sides of the process transmit the stress to the teeth. Thus, primarily, it is the teeth that move. Dr. Case has ingeniously argued that this force against the teeth is transmitted to the buccal plates, carrying them outward, and that these drag the bone in the interproximal spaces with them, and these in turn drag the palatal process. I have no contention to make against this, for even though by this means the vault is widened, the widening is solely in the process, and it is the teeth which have been primarily moved. Moreover, the teeth move a greater distance at their occlusal ends than they do at their apices, and this accounts for the buccal tipping. It is only by opening the suture and spreading the maxillae that buccal teeth may be moved without tipping. At least I have not yet heard of any other means of accomplish-



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ing this with certainty, and without loosening the teeth in their sockets and thus rendering them the less useful as anchorage for retention.

Dynamics. The displacement of the split plate and its withdrawal from contact with the dome is further dependent upon another principle common to all applications of force in orthodontia, with a single exception. I merely state it here, and shall make further comment later. The jack screw *exerts its greatest tension against the greatest resistance*. This is the theorem. Analyze and you will better comprehend my meaning. The instrument is placed in the mouth and screwed up as far as possible. This is its greatest tension. The teeth at the same moment are offering their greatest resistance. The degree of stress permissible therefore is limited by the means of securing the plate

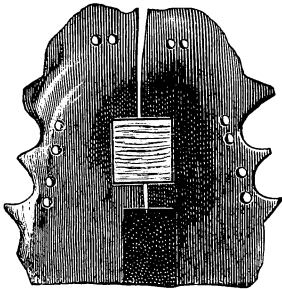


Fig. 8.

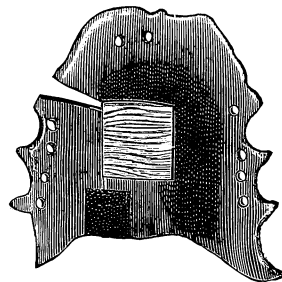


Fig. 9.

in place, and this is very slight owing to the slant of the palatal surfaces of the teeth. As the teeth begin to yield we have a lessening of the resistance, also a lessening of the stress, and a consequent decrease in the stability with probable loosening and even displacement of the plate. The last half of the theorem then is that with the split plate and jack screw, we have *a decreasing stress exerted against a decreasing resistance*.

The plate which I use overcomes all of the objections mentioned, operates in a totally different manner, is universally applicable and almost unlimited in the scope of its usefulness.

Description of Plate.

It is made of vulcanite rubber, and is made as thick as the height of the vault will permit. At the center of the posterior margin before vulcanizing a piece of the rubber is cut away and replaced with velum, or soft rubber. Thus after vulcanization the plate is of hard rubber throughout, except at the back edge, where we have a small square of soft rubber. A square aperture is cut through the center of the plate into

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which is fitted accurately a plug of the softest pine. This aperture is slightly beveled so that the wedge of pine wood will be somewhat wider at the palatal than at the lingual aspect. Before placing the plug securely, as will be described, the plate is split through the hard center, down to the soft rubber. Such a plate with pine wedge in place is seen in Fig. 8. Experience taught that this plate would be more serviceable if it could be made more rigid, and if the pine wedge could be prevented from possible movement, thus precluding the chance of rising out of its bed and bruising the soft tissues. This is accomplished by drilling a hole through the plate into the wedge, at each side, and pinning the same with orange wood. In Fig. 9 the orange wood pin is seen cut off in one place and still protruding

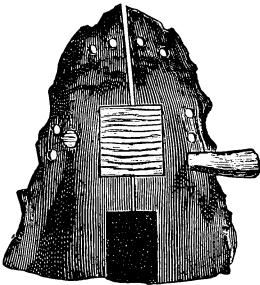


Fig. 10.

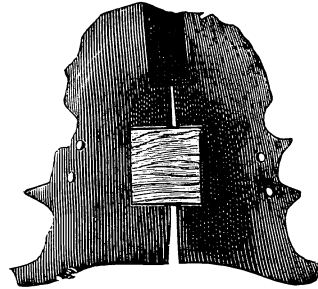


Fig. 11.

at the other. The plate is now ready for the mouth. Holes are drilled opposite the central incisors and bicuspid. In younger patients the holes would be opposite the temporary molars, for it is one of the prime advantages of this plate that it can be operated in connection with temporary teeth without the least danger of loosening them.

The plate is placed in the mouth and held in position by ligatures. I use linen thread, the contraction of which when wet renders the plate more stationary. I tie to the central incisors, provided I wish to open the suture. This controls that result. Where widening across the bicuspid region only is desired, then the plate should extend no further forward than the cuspids, in which case no stress will be exerted against the suture, or, at least, none great enough to open the suture. But if we tie to the centrals the maxillae will spread apart. Usually we obtain all the widening desired in this manner, but occasionally we may require additional width in the molar region. This may be accomplished by placing the soft rubber hinge at the front and splitting the plate from the back end, as is shown in Fig. 10. In still other condition we may desire to move only the teeth of one side, in which case the split is made at that aspect, as in Fig. 11.* There

*In such cases this method would have no special advantages.—Author.



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are many other variations, but it is needless to record them; here I desire only to set down the principle.

Mode of Using. In practice I usually arrange to place the first plate in the mouth on Saturday. The patient returns on Monday, and the plate is removed, cleansed, and the mouth thoroughly sprayed. A new and larger wedge is inserted and the patient returns on Friday. The plate is removed, cleansed, and an impression is taken, the plate being returned without changing the wedge. The patient returns on Saturday and an entirely new plate is introduced. The same series of visits in the second week brings the patient to us on the following Friday, with the maxillae spread sufficiently for "jumping the bite," or other regulation. On Saturday a simple roof plate retainer is put in place. This is worn for two or three weeks without being tied and the maxillae are kept permanently apart by the deposition of bone along the suture.

Time Required. In the same number of the *Dental Review* from which I have already quoted, Dr. Case describes his use of the split plate with jack screw force and he says "the arch will be sufficiently expanded in from one to two months." Others have reported the same time as requisite, and such had been my own experience, except where I used very short jacks, placed high in the vault acting against plates made of irridio-platinum, entirely cut apart, and held in place by bands soldered to them and cemented to molars and bicuspid. This was my first solution of splitting the suture, and even then I required from three to five weeks, seeing the patients twice a day for tightening the screws. Now I accomplish the result in two weeks, seeing the patient three or four times a week. The screw pressure was painful, the wedge plate is painless. The screw pressure plates, even when cemented on, often tore loose, and were brought in in the patients' pockets. The wedge plates, properly tied, never come out nor loosen in the slightest degree. I should mention here that, in order to lessen the chance of irritation from the ligatures, the plate is tied first to the first bicuspid; at the next sitting to the second bicuspid; at the third to the first, etc., alternating so that each pair of teeth has a period of rest.

Dynamics Compared. We come now to the underlying principle of the plate. The theorem for the jack screw plate was "*The greatest stress against the greatest resistance, and in action, a lessening stress against a lessening resistance, with consequent loosening.*"

The theorem for the wedge plate is "*The least, or no stress against the greatest resistance, and in action an increasing stress against a decreasing resistance, with a consequent tightening of the plate.*"

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The wedge is the only force which is at its lowest stress when first inserted. In all other forms of force, the screw, the spring, the rubber, wire, or linen ligature, we have the greatest force exerted at once, and this force decreases as the tooth yields under stress, and it is this one fact, the application of the greatest stress against the greatest resistance, which accounts for 90 per cent of all pain in orthodontia.

I pointed out how and why the split plate operated with a jack screw exerts force against the teeth and widens the arch by moving the teeth in their sockets.

It is true that the same can be done with the wedge plate, provided the plate be not tied forward of the cuspid region. But if the plate be tied to the centrals, *the immobility of the fixture, the resistance of the teeth of both halves of the jaw in phalanx, and the fact that the force is applied high up and directly next to the suture*, all this coupled with the very important fact that the soft rubber hinge permits opening of the plate without dragging it down from contact with the dome, results in a spreading of the maxillae by opening the suture, *the resistance along this line being less than that in the combined tooth sockets.*

Study of the Suture.

We have all in the past spoken quite freely of opening this suture, but I have nowhere seen any consideration of just what may occur when this is attempted. I have tried to obtain a young cadaver and apply this plate, so that I might study the anatomical results, but such subjects are rarely obtainable and usually in demand by specialists in close touch with the dissecting rooms. We may, therefore, only theorize, and I do so to open the way to further discussion. The palatal suture being in the nature of the teeth of two cogwheels, it would be easy enough to understand their disarticulation provided no other bone were involved. But just above this suture the vomer is inserted. What is the nature of this articulation? Does the vomer have a spreading base, and does its articulation straddle the palatal suture and thus have relation with both maxillae? I think this is the normal condition; but I also believe that quite frequently it will be found that the vomer is deflected to one side and is articulated with but one-half of the maxillae. In such cases the opening of the suture will be easier than where the vomer articulates with both, but even then the maxillae may be spread, the result presumably being a sliding motion, the articulation opening throughout; that is to say, all three bones separating, or rather both maxillae being drawn away from the insertion of the vomer.

Much has been said of the relation of the orthodontist and the rhinologist, and yet it is hard to comprehend how the usual methods of widening the arch can materially affect the nasal cavity. By spreading the maxillae



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apart, however, we do really add to the width of the nasal cavity, and this gives added breathing room. This would be especially beneficial where the vomer is bent, thus partly or wholly occluding the nares on one side.

Discussion of Dr. Ottolengui's Paper.

Dr. Brady. At first thought it appears somewhat startling to entertain the radical measure of spreading the maxillae to the extent of opening the suture, as proposed in the past by various parties, and now recalled by Dr. Ottolengui; yet on study of the subject, it seems worthy of greater attention than has been given to it. Dr. Ottolengui has presented the matter clearly and has stated some truths concerning the ordinary method of spreading the arch that every one of even limited experience in orthodontia must recognize as unwelcome facts accompanying most cases of this kind. The tipping of the molars and bicuspid as their crowns are moved buccally is a matter of concern to even the experienced orthodontist, and to many less skilled operators it has become a source of failure on account of either the inability or the lack of foresight to keep this tipping within bounds where the final occlusion would allow the teeth in question to work into a stable occlusion to the full depths of the cusps.

Even in favorable cases it takes some time for this to occur, and it must be admitted the teeth are more or less unstable during this time, and a source of apprehension lest something unforeseen might prevent the final good results.

Improvement by Development after Treatment.

The essayist, however, has neglected to mention the accelerated growth and development that follows a case of ordinary spreading the arch if done before the period of development is passed. This after-development is not confined to the alveolar process, but extends to all associated parts including enlargement of the entire superior maxillary with its contained sinuses, and the undoubted enlargement of the nasal opening.

The entire bony structure of the face seems to receive a stimulus from the artificial spreading of the dental arch, the accelerated growth and development persisting for several years in most cases, bringing about a considerable outward movement of the apices of the roots and correcting the initial tipping to a marked degree. There are too many authentic cases of the betterment of things from this after development to doubt its existence or effects, and its correcting influence must minimize some of the conditions noted by the essayist as grounds for more radical procedure.

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It might also be said in passing that this after-development is responsible for much of the improvement credited by some writers to wonderfully constructed apparatus for moving the roots of the teeth outward. I have repeatedly gained the result of outward movement of the apices of the roots, especially of the anterior teeth by no other means than by letting them alone, after the crowns had been originally moved to place by the simple expansion arch. Nature is often robbed of her just dues by ambitious man. The behavior of alveolar processes under pressure as in regulating, needs much more elucidation, and on account of some of the known deficiencies of this structure, I am led to believe that bodily spreading of the maxillae may be of value in orthodontia.

Characteristics of the Alveolar Processes. The alveolar process has none of the ordinary provisions for this repair of bone. Nature provides but one method of change on this structure—that of absorption or new deposition. It is never repaired as other bone is by the throwing out of an exudate and provisional callus, with new growth of bone in a few weeks. There is no repair by sub-periosteal renewal. If as in some cases of necrosis the periosteum be dissected away and the dead bone beneath removed, there may be a shell of bone formed by sub-periosteal renewal, but such renewal is confined to the maxillary bone proper and no part of the alveolar process is thus formed.

While it may be absorbed at almost any age, its deposit is another matter, and seems to occur only through the agency of the osteoblast cells, under conditions somewhat similar to its deposition in the first place around erupting teeth. During the early years of life, the process is torn down and built up some three or four times, and during this period the teeth may be moved to a great extent and the process will follow them, and in the end be as solid as can be wished.

The heyday of this activity is from the eighth to the thirteenth years; but after that age it begins to wane actively, until at from sixteen to eighteen there is but little active deposit of this bone.

Some slight and very slow deposit may be secured even up to twenty-two or twenty-five, but it is poor in quality and unreliable for the serious business of retaining teeth in place.

Advantage of Opening the Suture. If the orthodontist fortunately secures his case early, the slight loosening of the teeth that occurs in movement is of little moment; but if the patient is older than thirteen or fourteen, it is a more serious matter, and it is in these cases that I believe opening the suture might be valuable.

If the suture is held rigidly open there should be a new deposit of bone



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in the space, the same as in any other structure; and a few weeks should be sufficient to secure permanent widening of the bones.

It should be said, however, that this is not an operation for a careless man, for it is easy to see how much harm might follow careless or slipshod methods; and there must be a certain element of danger in it at the best.

I have had some slight experience with cases of this kind, and must say the suture is not difficult to open, and the operation is practically painless.

In two cases I tried to expand the arch by the **Cases from Practice.** old method of a jack screw across the roof of the mouth, and distributing the force, and by means of a bar on the lingual side of the bicuspid and molars. In both those cases the pressure was applied with much vigor. Almost before I knew it—in about ten days—the suture was open, much to my discomfort. I did not follow up the advantage gained, as I might have done, but hastily withdrew the appliance, and gained only the knowledge that the maxillae could be separated both easily and without pain. No bad effects followed in either case.

In another case undertaken with assistance of Dr. George V. I. Brown, it was desired to open the suture and separate the maxillae as much as possible, to aid in opening the nasal passage, closed by accident in early years. A very similar appliance was used, and the maxillae separated a considerable amount in about two weeks, all without pain to speak of. Unfortunately the patient passed out of reach, and I have no means of knowing how he is now; but the opening of the nasal tract was accomplished without doubt, and the occlusion of the teeth much improved.

All this is confirmatory of the essayist's findings.

Appliances
Condemned. But on the question of appliances for performing this work, I must protest against the old rubber plate being dug up and exploited as a desirable appliance in this age of the world. The day of the rubber plate as a regulating plate is past and gone, and let us hope forever. It is uncomfortable, unclean and unreliable in every way for exerting mechanical force upon the teeth. There is nothing that can be done with it that cannot be done with more comfort and less trouble in every way with something else, and the chances of failure lessened by a great per cent. The essayist's contention that the plate bears against the soft tissue and accomplishes the separation of the maxillae thereby is without foundation. The pressure in such cases would be sufficient to cut off nutrition from the soft tissues, if directed solely against them. The fact remains that the separation was accomplished by means of pressure against the teeth. If not,

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why the need of tying the plate to the teeth? The answer must be that without tying, the plate would loosen and destroy the pressure which in the end was exerted most largely through the teeth. However, the question of doing is more important than the question of doing with; and if the desired end is secured by any reasonable means, it should not be condemned, because some one does or might have done easier with other tools.

Let us thank Dr. Ottolengui for bringing this before us, and each resolve to add something to the stock of knowledge concerning it in the future, and perhaps some of our present troubles may be lessened as well as human welfare promoted.

Dr. R. D. Griffiths,
Paris.

I would like to ask how without the means of X-ray it is known that the suture had been opened.

Dr. Calbot.

patient's return.

I would like to ask the essayist if he finds any difficulty in removing the peg that holds the block of wood in place, when he goes to remove it on the

Dr. Dodson.
The essayist says that by having the minimum force exerted at the start, it does away with a great deal of pain at the outset. I should think that the lessening of the force by the old method, the spring or the jack, would be less painful.

Dr. Angle.
I do not believe in the president being a talking president, but I would like to say a few words on this subject. I am not going to try to settle the point whether it is advisable to widen the arch by splitting the maxillae in the way the essayist has described. I do not know whether that would be advisable or not. Others may decide that. I have never seen a case where the arch spread in that manner, although I have heard of such cases. It seems to be almost a common occurrence in some men's practice, judging from their writings.

I cannot speak intelligently on that point; but if it is desirable to widen the arch and split the suture, I do not see why we should use a plate. The Doctor says the molars will be tipped if we use any other device—if we use a spring—and that they are not moved at the apices. He tells us we could not exert force in the region of the arch that is most narrow. He also tells us that it is a fad to run down plates. In the first place why do we run down plates? Why have they gotten into disrepute? I think for the very wisest and best of reasons. They are unreliable, they are very uncleanly, and we do not have the control over the teeth that we would by other methods. I think anything we can do with a plate we can do quite as well with some skeleton





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form of appliance. I do not think there is really any difference between the force, whether it comes from the rubber, the springs, the screws or anything else. It is all pressure, and we can exert as much as we choose with the expansion arch. I do not think it is correct that we cannot get a lateral pressure with the expansion arch. All of my students who are familiar with the use of the expansion arch and the wire ligatures, know we have perfect control of every tooth in the arch, individually and collectively. We can exert any degree of force we wish. If there is not spring enough in the arch itself, we can add the reinforcements. We have something that is cleanly, too, and we can have the pressure just where we wish it. If the expansion arch is intelligently operated, we can apply force exactly at the points we wish. I see no reason why we should use the plate. Still, if men can do better work with the plate, why should they not do so?

When I consider those pictures I saw on the screen a few moments ago, I feel like speaking in behalf of the patients, who have to wear them. My children go to school, and take music lessons, and lessons in elocution, and I do not think they could make much progress with that apparatus in the mouth. One important point the Doctor omitted, that is, to take into consideration the subsequent development after the teeth are placed in occlusion. I do not care if the teeth do incline out as he says they do. I do not care if the molars and incisors do flare out from their apices. That does not concern me at all. He has failed to realize that there is something which comes after, which is extremely important, and that is Nature's course of developing according to the new conditions of occlusion.

Those who have read my book carefully remember a certain model I have reference to. If you come to my office I will show it to you. After the arch was widened, the molars stood out and the incisors stood out; the apices were practically where they were before any pressure was put on; but in two years' time the arch had developed, the vault of the arch was larger, and those teeth were standing in a beautiful upright condition as a result of Nature's development. As soon as we placed those teeth where they would work, where the proper function could be exercised, then the jaw went on developing. The apices of the teeth came forward—we did not have to move them forward—as Dr. Case says we must do, with that device he has. Nature did that much better than Dr. Case does.

Dr. Lourie took some measurements carefully of how much that jaw was widened. We have a slide which we use in the school, and it was a great pleasure to me to see how much that case had changed in two years.

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When the arch is narrow and the teeth in malposition the teeth do not perform their proper function, and Nature does not have the same chance to act. I cannot see that it makes any difference if we split the arch as advocated by Dr. Ottolengui, or if we put the teeth in normal occlusion and let Nature do the rest.

If I do not agree with Dr. Ottolengui always, it is an honest disagreement. If he or anybody else can use that method and do better with it, I certainly wish him to do so. I am only giving you my earnest and honest opinion in regard to the matter.

I wish neither to approve nor to condemn
Dr. Watson. this paper, but merely to state a few facts in my own personal experience. Dr. Ottolengui mentioned especially two objects in this procedure—one that by widening the arch in this way the molars are in a stable position to use as anchor teeth afterwards—and another, that the enlargement of the nasal space is probably greater than when the arch is widened by the use of the expansion arch.

In regard to the first, take for instance a case of the first division of Class 2—a case of protruding teeth and narrow arch. Suppose we widen our arch with this, it is then necessary to use an arch to change the mesio-distal relations. After we have done that, we render the molars unstable for anchorage purposes. Therefore one of the chief objects in doing it this way is overthrown, as I understand it. If there is any one subject in all orthodontia that I am interested in, it is the relation of our work to that of the rhinologist.

Some curious facts have developed in my study
Influence of Spreading the Arch upon Nasal Passages. of the subject. I will mention a specific case now, where the membranes and tissues covering the nasal passage were hypertrophied to a great degree so that a famous rhinologist was unable, after three or four years' treatment to restore the breathing to anything like normal. The child was compelled to breathe almost entirely through his mouth. The dental arch was very narrow and was widened in a comparatively short time with the expansion arch. The upper teeth were not protruding, so that it was possible for him to get his lips together without any effort. They came together when the mouth was closed, but were held apart solely for the purpose of getting air.

By the use of the expansion arch, the most wonderful nasal development took place within a few months. The patient lived at a great distance and was not under close observation; but letters from the mother were such that there could be no doubt about the result. She said the boy slept with his mouth closed, the snoring disappeared, he breathed easily, his facial expression was changing, and she mentioned all the



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things we would naturally expect to take place when a child was restored to normal breathing after he had been for years a mouth breather. This took place within three or four months. I mention this because we do unquestionably increase the breathing space in those cases. Just how it is increased, I do not think any living man can say. In my judgment several things enter into it. I believe spreading the arch was the initial step, but I do not believe that alone did it.

Another curious case was that of a patient who had the first division of Class 2, a pronounced protrusion of the upper teeth, but the arch required very little widening. This also was a case where the nasal soft tissues were hypertrophied to a marked degree, but not a suitable case for operative procedure from the rhinologist's standpoint. The case was corrected, and nearly a normal arch obtained. It came into apposition, and in about eight months' time, without any local treatment, the child still living among the same surroundings that she had lived in for a number of years, the normal breathing capacity increased to a very great degree.

The strange feature of this case in my judgment is that the nasal spaces had been remarkably increased without any very great widening of the arch. It was very slight indeed—so that it was never retained at all. It is only slightly wider now than in the original model. Here we see a most happy result.

That leads me to wonder whether it is advisable for us to attempt to open the suture, or whether the ordinary means are sufficient in younger patients to stimulate Nature to do her duty in restoring normal function.

I mention these things that we may think of them and not that I wish to draw any definite conclusions.

Dr. Ottolengui.

Dr. Brady, although he had a copy of my paper, misapprehended me. I did not say that the jaws separate because the pressure is on the soft tissues, or the resistance was in the soft tissues. The reason the suture opens is because the plate is fixedly attached to all of the teeth on each side, and the resistance of all the teeth in their sockets on each side is greater than the resistance at the suture. Of course the force is against the teeth. What I did say about the soft tissue was that in the Coffin plate, as it has been commonly used, it has had a stiff hinge at the back, and when the force was applied, it came down; whereas in this plate it remains firmly in the mouth. Also the force of the screw is on a different plane—opposite the necks of the teeth. The force in the wedge plate is immediately next to the suture, high up in the dome of the mouth.

I am told that the rubber plate is unwarrantable, unclean and un-

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necessary. *It is not unwarrantable; it is not unclean, and it is absolutely necessary until some one shows us another instrument with which to accomplish the same thing with the same exactness.* There have been many cases of opening the suture, but they all have been accidents or incidents in the practices of other men. I have done it intentionally for over fifteen years. I can show you at my office a drawer full of these instruments, and I have not kept more than half.

I am willing to concede that children may not be able to sing very well with one of these plates in the mouth, but two weeks absence from singing school is no great deprivation. I remember one case where a woman came from the West to see me. She said: "I came here for two purposes. I come from Denver, and I want to have my teeth regulated and I want to learn to sing." I said: "Which do you think is the more important?" She agreed to have her teeth fixed first, and when she went back to her singing the teacher told her her dentist had improved her voice as much as he could have done in the same time, because the difference in the width of the arch gave her a better singing apparatus.

I beg to be disassociated in your mind from the ordinary users of the rubber plate. Where I have used the plate in the past, it has been a plate of iridio-platinum, and will you pardon my saying that iridio-platinum is much cleaner than German silver? There is no oxidation, and we do not have to take nearly as much care as with any of the apparatuses of German silver. German silver is much more unclean than the rubber plate, in my hands.

Dr. Angle. It is the form of the appliance, more than the material, that is objected to.

Dr. Ottolengui. This rubber plate, as I use it, is clean. It does no harm. If there is any uncleanliness, it is between the soft tissues and the roof of the mouth, and that does not injure the teeth. There might be a slight reddening, but as soon as the rubber plate is removed and replaced by a platinum roof retainer, that is all done away with.

I was asked how I know that the suture ever opens. I have often been able to run my finger over the suture and feel the separate edges of the two bones. I have also passed needles through the suture.

Dr. Talbot asked as to the removal of the peg. It would be difficult to remove the peg after it is cut off, were it not for the fact that you can split the plate apart and pull these pegs out. This paper is hardly intended to give much of a description of the technique; if I thought it were desired, I would give another paper at some other time.

One gentleman said he could not comprehend why a low force against a high resistance with an increasing force against the decreasing resistance



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is less painful than when you applied the greatest force against the greatest resistance.

If we may descend to frivolity for a moment, I will illustrate: If a gentleman were standing here, and I placed my fist quietly against his head, that would be the least pressure against the greatest resistance, and he would have no pain; if I pressed gently with increasing force against his head until I forced the head over on to his shoulder, I would have moved it with no pain; but if I hauled off, hit him hard, and moved his head in that way, he would find it very painful, I am sure! That would be the greatest force against the greatest resistance.

In opening the suture we are not moving the teeth, in the ordinary acceptance of the term. The bones are being moved. As soon as we get through with that, go back to the other mode of applying fixtures. I only brought that in to explain why there is no pain along the suture. It is because it is done in a gentle way.

Dr. Angle, Dr. Brady and other gentlemen have told me I have overlooked the future development.

Future Development. Where have I overlooked it? Why should there not be future development in my cases as well as in cases where you slant the teeth out? If you give people a better breathing apparatus immediately, why will there not be future development just as well as in cases where you wait two years for it?

I know that children treated in this manner have ceased to be mouth breathers *immediately*. I know that slight adenoid vegetations have disappeared in some cases without operation. If we give these people a chance to get a lot of oxygen, immediate improvement begins to take place.

I wish to say that the particular advantage is in very young mouths before the cuspids and bicuspid have come in at all. If nothing were done, the teeth would come in out of line. I have taken such cases, and by spreading the maxillae apart, and bringing my central and lateral incisors together, I have seen development of jaws go on, and all of the unerupted teeth come in, in perfect alignment. We move the jaws and the erupted cuspids and bicuspid, still embedded in the bones, are moved also. Is there any other way of moving such teeth? Will they not be better and straighter and more firmly fixed in their sockets when they are thus afforded opportunity to erupt in normal occlusion, than when forced into occlusion after eruption? Is a tooth moved in its socket ever as firm again as before interference?

I was very early in the field to take patients at seven and eight years and do these operations; and I ask you to consider that thus far I have been the only one who has been persistently opening the suture for over

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fifteen years. You cannot compare my results with the accidental happenings of other men. Dr. Brady said, as soon as he discovered that he had opened a suture, he allowed it to go back.

Dr. Watson said one of the advantages claimed by me is that we would not disturb the apices of the molar teeth, and they can be used as anchorages; he replied that where there is a superior protrusion to be reduced, there must be a disturbance in the socket stability, because of the appliances used after opening the suture. I say not at all. My procedure has been in those cases as follows: As soon as I have widened my upper jaw in this manner, I have made room for the reception of the lower jaw in its proper position. I have an occlusion perfected in the molar region without having placed any attachment on any of the upper teeth. The anterior superior protrusion can be reduced with a head cap, without strain upon the upper molars.

Dr. Watson.

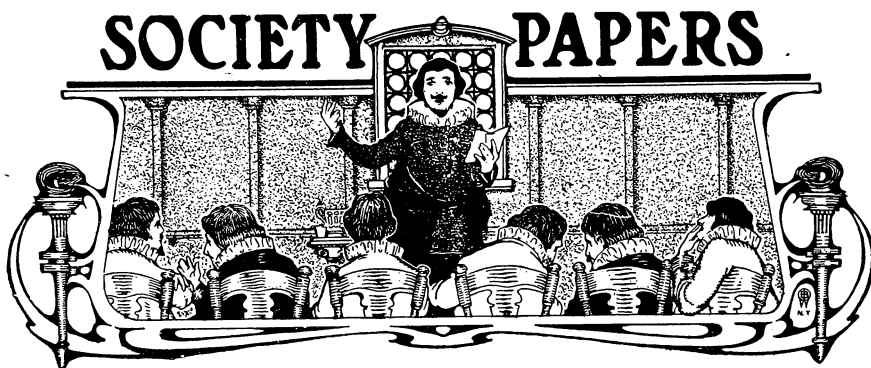
Suppose you have a case that requires a development of the lower jaw, and a retrusion of the upper. Will you not use your upper jaw as an anchorage to bring forward your lower? Where will you get the anchorage to develop the lower jaw?

Dr. Ottolengui.

I do not claim that there are no operations in which you need to use your molars as anchorage; but I am only showing the advantage where you can get along without using them. Suppose you move your molars and bicuspid out to their lateral width, as I said, and that is why I particularly introduced this case. After I had widened the jaw, all the subsequent procedure was done with an Angle arch. No proof plate was used whatever after the first two weeks; but provided those molars are where you want them, all the teeth in the upper arch can be firmly fixed to your bar and you are not making any-strain on any one tooth.*

*The query by Dr. Watson introduced a subject of such vast importance that I did not deem it best to discuss it fully in an impromptu manner. What I did say, therefore, the stenographer was requested not to take. The question involved is no less a one than a study of the comparative value of "jumping the bite," and what I think may well be called "jumping the occlusion." The former involves a forward movement of the whole mandible. The latter a forward movement of the whole lower set of teeth with the surrounding processes. Upon this subject I shall hope to offer a paper at some future time. To reply more categorically to Dr. Watson, I may say, however, that his question seems based upon the seeming necessity for involving the upper molars, when an upper protrusion is to be reduced, coincidently with a forward movement of the lower arch, "jumping the occlusion." If the Angle expansion bar is used in connection with intermaxillary force, there need be no disturbance of the upper molars (the future anchor teeth), provided the bands are accurately placed so that the expansion bar runs freely through the tubes, and without exerting lateral pressure. But the head gear apparatus may be utilized and the intermaxillary force may be attached to the mouth bit which engages the upper front teeth, and to the lower molars. Thus no appliance whatever would be upon the upper molars.—R. OTTOLENGUI.





The Chemistry of Pulp Decomposition, with a Rational Treatment for this Condition and its Sequelae.

By J. P. BUCKLEY, Ph.G., D.D.S., Chicago, U. S. A.

(Abstract of paper read before the Fourth International Dental Congress, at St. Louis, 1904.)

By way of introduction the author maintains that the application of drugs for the correction of putrescent conditions can never be placed on a rational basis, until we more fully comprehend the chemical reactions and thus obtain a definite notion of the end-products produced by decomposition on pulp tissue. In his study of the substances found in animal tissue he erects two classes based on the presence or absence of nitrogen. He then at considerable length describes the nitrogenous and the non-nitrogenous substances. He continues as follows:

Fermentation and Putrefaction.

Before doing so, however, it may be well that we have a clear understanding of what is meant by the terms fermentation and putrefaction. These terms are applied to peculiar kinds of decomposition by which the molecules of certain organic substances are broken up into simpler compounds. The difference between the terms is that fermentation is applied to the decomposition of those substances which belong to the group of carbo-hydrates, while putrefaction is applied to the decomposition of those substances which properly belong to the proteid group, and are classified as nitrogenous substances.

The decomposition of the pulp tissue is essentially an analytical process, which takes place gradually. Through the agency of micro-organisms these complex bodies are broken up into simpler and well known compounds.

That is to say, the micro-organisms first act upon these complex and unstable substances, splitting them up into less complex compounds, which, however, are capable of further analysis, and the process goes on, conditions being favorable, until the decomposition is complete.

The desire to acquaint myself with the nature of the reactions taking place in this process has led me to do much investigating along this line during the last few years; and I state here, without any hesitancy, that the chemical reactions taking place in the pulp chamber and root canals of teeth containing pulps undergoing the process of decomposition, cannot be duplicated in test-tubes in the laboratory. This study and thought, however, has caused me to come to the following conclusions, which I believe will agree with the clinical experience of every careful observer.

I believe that the initial process in the decomposition of the pulp tissue is one of *fermentation*, which is brought about by the action of micro-organisms upon the carbo-hydrate constituents, producing among other compounds such acids as carbonic, $\text{H}_2\text{CO}_3 (\text{H}_2\text{O} + \text{CO}_2)$, and acetic, $\text{HC}_2\text{H}_3\text{O}_2$, depending largely upon the micro-organisms present in the tissue. This creates an acid medium which favors the action of those micro-organisms, here ever present, having the power to decompose the complex proteid molecule in such a medium, and the process of putrefaction is thereby inaugurated. Among the first products produced are hydrogen sulphide, H_2S ; putrescin, $\text{C}_4\text{H}_{12}\text{N}_2$, and two isomeric substances, cadaverin and neuridin, $\text{C}_5\text{H}_{14}\text{N}_2$. As the process goes on, these latter substances are gradually broken up, and ammonia, NH_3 , or derivatives of ammonia, are evolved.

I have been led to believe, also, that the fatty constituents remain practically unchanged in the entire fermentative and putrefactive processes and that they exist in the putrescent mass of a pulp chamber and the root canals. The bacteria may split up neutral fats into glycerine and fatty acids; but other than this, no change seems to occur. Every chemist is familiar with the fact that carbohydrates are unstable compounds; that they readily undergo the process of fermentation, and that neither an acid nor an alkaline medium is essential for the action of the exciting agent, whether it be a ferment or a micro-organism. It is also well known that proteid substances are easily putrified by micro-organisms in the presence of the *proper temperature, moisture and an acid medium*, all of which are present in a pulp chamber after the process of fermentation has begun. That fats are emulsified or saponified by alkalies, or ferments in an alkaline medium, is also a well established fact. Such a medium, I believe, in the pulp chamber of a tooth never exists from the time the fermentative process begins until the putrefactive process is complete.



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The End-Products. It is well to remember, then, that early in the process of pulp decomposition the carbohydrate and proteid or albuminous constituents are decomposed, and that the chief final products are water, carbon dioxide, ammonia, acetic acid, and a semi-putrid substance which, for reasons mentioned, I believe is largely composed of fats, depending upon the extent to which the process of decomposition has progressed. It should be remembered, too, that simultaneously with the breaking up of the pulp tissue the dentinal fibrillae are also decomposed, and that the dentinal tubuli, as well as the pulp chamber and root canals, are filled with the end-products of the decomposition, together with little globules of fat or fatty acids.

Having stated what seem to me to be the chief final products of pulp decomposition, and, therefore, the compounds with which we have to contend in the treatment of these cases, I beg permission to direct your attention to this phase of the subject.

Coagulating and Non-Coagulating Agents. Those of you who have read the literature of our profession for the past ten or fifteen years know that the opinions of many investigators in regard to the penetrating or non-penetrating power of coagulating agents in a putrescent root canal are many and varied. The reason for this variance of opinion I have never been able to understand. Many of the leading men of our profession have objected to the use of coagulants in the treatment of putrescent pulps and abscesses without a fistulous opening, for the reason that such agents will, in their opinion, coagulate the albumin present and thereby prevent their penetrating the contents and that the coagulum is also liable to close the small root canals. On the other hand, there are many who advocate that albumin, though present, does not prevent the penetration of coagulating agents, and that such take place throughout the pulp chamber and root canals, as well as the dentinal tubuli. Both sides attempt to sustain their theory by many laboratory experiments. Those who object to coagulants in the treatment of these cases illustrate the coagulating action of such agents upon the albumin of a fresh egg. The conditions here are not at all similar. Should an egg which has undergone the process of decomposition be substituted for a fresh egg, it will be noticed that no coagulum is formed; for the simple reason that the proteid constituents (coagulable material) have lost their identity by chemical decomposition, and new compounds, with entirely different properties, have been formed. This explains, too, how the advocates of the penetrating power of these agents have seemingly succeeded in sustaining their theory. It has been shown that coagulating agents, in contact with egg albumin in sealed capillary tubes, penetrate the entire mass; and that the action of these agents is self-limiting only up to the

quantities used. By sealing these agents in extracted teeth, with the cementum removed, and embedded in plaster, it has been shown, also, that they penetrate the entire tubular structure. These experiments prove conclusively that coagulants will penetrate the putrescent mass of a root canal, but do not prove, to my mind, that albumin as such is here present. I am not anxious to antagonize either side in this controversy, but it is a subject, as I have previously mentioned, in which every practicing dentist must be interested, and yet one which seems never to have been successfully settled. It seems to me, therefore, that we should not be over anxious to criticise each other's views, but each should study the chemistry of pulp decomposition, and thereby acquire a knowledge of the chemical facts relating thereto. It is by this method only that this subject can be scientifically mastered.

In selecting drugs, then, to be used in the rational treatment of these conditions, I shall eliminate the question of coagulation and select agents with reference only to their ability to unite chemically with the end-products, resulting from pulp decomposition. In this connection we should remember that the putrescent condition has been brought about through the agency of micro-organisms by a gradual analytical process; that many of these germs are pathogenic in character, and that among the first products of importance are hydrogen sulphide, putrescin, cadaverin and neuridin. The last-named compound, being non-infectious, is of little importance, other than to know that it is a nitrogenous substance from which ammonia is evolved by further putrefaction. Still, according to Vaughan and Novy, while pure neuridin is non-poisonous, it possesses a toxic action as long as it is contaminated with other poisonous products of putrefaction. This holds true for all non-poisonous bases. Hydrogen sulphide is important because it is an *acid gas* with a disagreeable odor, having local irritant properties; and also because of the part it plays in the discoloration of the tooth structure. However, I must say here, while I realize that hydrogen sulphide is an active chemical agent, that, in my opinion, it has been greatly overestimated in the rôle it assumes in the discoloration of teeth from the decomposition of the pulp tissue. Putrescin and cadaverin are perhaps the most important compounds, in so far as the correction of the putrescent condition is concerned, known to be formed in the splitting up of the proteid molecule. Like neuridin, they are basic nitrogenous compounds, capable of undergoing further putrefaction, evolving ammonia; but, unlike this compound, while they were at first regarded as physiologically inactive, both these bases have been proven, by Scheurlen, Grauwitz and others, to be capable of producing inflammation and necrosis.



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Among the gases produced, then, in pulp decomposition are carbon dioxide, ammonia and hydrogen sulphide. As these gases are evolved in those cases where there is no free exit from the pulp chamber, through a cavity, pressure is produced and in many instances they escape through the apices of the roots, carrying the poisonous ptomaines into the surrounding tissue; inflammation is thereby produced, and an alveolar abscess established.

In those cases where we open into the pulp chamber and find a pulp undergoing the process of decomposition, and when the ptomaines and end-products have not been forced through into the apical tissue, our treatment should be to at once *hermetically* seal into the pulp chamber an agent which is volatile and thereby penetrating, and which, as it comes in contact with the end-products, will unite chemically, converting them into odorless and non-infectious compounds. Such an agent we have in *formaldehyde*, a gas, CH_2O , which occurs in commerce at a 40 per cent aqueous solution known as *formalin*.

It has long since been known that ammonia is one of the chief end-products in the splitting up of the proteid molecule. It is also known that formaldehyde unites with ammonia to form a solid compound, which is odorless, colorless and has a sweetish taste, known commercially as urotropin, chemically as hexamethylene-tetramin, with a chemical formula $(\text{CH}_2)_6\text{N}_4$. It is stated also on good authority that formaldehyde unites chemically with hydrogen sulphide, and basic ptomaines, forming inodorous compounds. Formalin, however, is too strong a solution for our general use; therefore, believing that the fats remain practically unchanged in the process of decomposition, I have been using cresols, in combination with formalin, which act chemically upon the fatty constituents. Cresols are homologues of carolic acid. There are three—meta-cresol, ortho-cresol, and para-cresol. The product best suited for our use is *tri-cresol*, a refined mixture of the three. It is a nearly colorless liquid, of a creosote-like odor, and is soluble in water to the extent of a 5 per cent solution. Tri-cresol has been selected as the vehicle with which to dilute formalin for three reasons:

1. It is miscible with formalin in all proportions, thus making a good pharmaceutical product.
2. It is a good germicide—nearly three times as powerful as carbolic acid.
3. It acts chemically upon the fatty constituents, thereby properly disposing of these substances.

The formula which I have been using with gratifying results in the treatment of putrescent pulps is:

R

Tri-cresol,
Formalini,

aa fl. dr. j (4.0 cc.).

M. Sig. On a small pledget of cotton, hermetically seal in the pulp chamber from twenty-four to forty-eight hours. One treatment is generally sufficient.

In the treatment of abscesses without a fistulous opening, it is well to modify this formula. In these cases the decomposition of the pulp tissue is complete.

The intermediate products (ptomaines) have largely been broken up, pus has been formed from the tissue surrounding the end of the roots, and the first step in treating such an abscess is to mechanically evacuate the pus. We have no necessity for using formaldehyde, then, in the same strength solution as in those cases where the pulp chamber, root canals and tubuli are filled with the putrescent material. The point I desire to impress is that formaldehyde in this strength solution *must* be confined to the tooth structure, for it is one of the most irritating agents known to the therapist. A safe formula for abscesses without a fistula is:

R

Tri-cresol,
Formalini,

fl. dr. j (4.0 cc.).

fl. dr. ss (2.0 cc.).

M. Sig. Mechanically evacuate the pus and, on cotton, hermetically seal in the canals from twenty-four to forty-eight hours. Two or three, oftentimes one treatment is sufficient.

Add to 5 cc. of strong ammonia water 3 cc. of formalin. A violent reaction takes place, forming urotropin $(CH_2)_6N_4$, which dissolves in the water $4 NH_4OH + 6 CH_2O = (CH_2)_6N_4 + 10 H_2O$. The clear solution is evaporated, using moderate heat during the last stages of the process, when the urotropin is obtained as a white, crystalline solid.

Pass a stream of hydrogen sulphide into 5 cc. of formalin for a few seconds. The odor is at once destroyed. This proves that a reaction takes place. I hold that methyl alcohol, CH_3OH , is formed, and sulphur is liberated, $2 CH_2O + 2 H_2S = 2 CH_3OH + S_2$.

On evaporating the solution to dryness, the methyl alcohol burns, leaving the sulphur, S, as a residue.

Tri-cresol, besides its germicidal power, dissolves the fatty globules which, if treated with alcohol (as is usually done in drying the canal) produces *lysol*, a good antiseptic. It is plain to be seen, then, that the *poisonous gases and liquids* resulting from pulp decomposition are con-





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verted by the proper use of formaldehyde and tri-cresol into *non-poisonous liquids* and *solids*, which are themselves antiseptic and germicidal in character. How can we imagine a more thorough sterilization of the dentine than to chemically produce within this tubular structure substances which possess these properties?

Thus I feel justified in speaking of the use of this remedy as a *rational treatment* for the conditions under consideration. Marvelous results are obtained, and at the same time we know why.

It should be remembered that the formulas given are for general use. The practical dentist will soon find that it may be best to vary the proportion of the ingredients of the mixture according to the case at hand. One great advantage in using remedies containing formaldehyde is that the medicament *must be hermetically sealed* in the tooth in order to obtain the best results. This prevents the saliva from contaminating the medicine within the tooth, and the medicine from contaminating the saliva in the patient's mouth.

The use of neither formaldehyde nor tri-cresol alone is original with the writer. I have studied the action of drugs, trying to place the treatment of these conditions upon a rational basis, and am gratified to know that such has been accomplished by the combination of formalin and tri-cresol in the manner which I have suggested.

In conclusion, I desire to say that many of the statements made in this paper are based upon well established chemical facts. Therefore, I cannot lay much claim to originality. However, I have endeavored to make a correct application of the chemical principles involved. The theory in regard to the decomposition of the pulp tissue may seem, perhaps, not to have been scientifically demonstrated; but it is the result of my laboratory investigation, and also is in harmony with my close clinical observation. As such, I present it to you for your consideration.

A Study of the Best Means of Local Anesthesia for Extraction of Teeth.

By DR. E. SAUVEZ. Paris, France.

(Abstract of paper read at the Fourth International Dental Congress, St. Louis, 1904.)

We should like to plead especially in favor of local anesthesia, in which we have absolute confidence, thoroughly persuaded that we speak in the interests of the patients and of the dentists and feeling assured that the operations will be thereby but the better executed.

Physiological Arguments.

General anesthetics act by inducing functional arrest in the nervous centers, according to an immutable, hierarchical sequence; in the first place, in the intégument, than in the medular, reflex centers, and finally in the bulb; if anesthesia is still further developed, the bulbous centers become paralyzed and death ensues.

According to the *Edinburg Medical Journal*, of November, 1903, the ratio of mortality produced by general anesthesia is as follows:

| | |
|----------------------|----------|
| Chlorure ethyl | 1/16.000 |
| Bromure | 1/ 4.000 |
| Ether | 1/12.000 |
| Chloroform..... | 1/ 2.000 |

Protoxyde azote Impossible of calculation.

However, 13 cases of death due to protoxyde are known (cases of Maurice Perrin, of Magitot, of Watson and of Duchesne).

And we are dealing only with fatal cases. We do not mention the frequent and serious accidents, the blue synopes from which the patients are only saved by artificial respiration. According to the witty expression of Prof. Recus, "for an accident to count, it must be fatal."

Operative Arguments.

We show in our memoir the difficulties of operation due to the inertia of the completely anesthetized patient and to the decubus dorsal, or reclining position, in which he is generally placed.

Medico-Legal Arguments.

In case of fatal accident, when the matter is brought to court, the judges, who would never question the use of an anesthetic for a serious operation, will often bitterly contest its employment when it is used merely for the extraction of a tooth.

After citing all the substances abandoned as impracticable, for instance, tincture of cannabis indica, strong carbolic acid, orthoforme, etc., we lay stress on the use of electricity as an agent of local anesthesia.

Electricity has been employed in two ways:

Electricity.

A) A current of high frequency directed towards the level of a tooth during a variable period previous to extraction (Regner and Didsbury).

B) The introduction of medicinal substances (cocaine) within the tissues, by the aid of electricity. This is the cataphoresis based on the theory of Faraday's ions (Pont).

After expounding the operating manual of these means of local anesthesia, we develop its critique and show that electricity, as an agent of anesthesia, is not to be depended upon, presenting many inconveniences and difficulties.



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We are thus forced to bring forward cocaine, or its derivatives, which, in injections, seem to give practical results superior to all other methods of local anesthesia known at present.

Cocaine. Practically, cocaine is a local anesthetic; from a physiological standpoint, it is a general as well as a local anesthetic. * * * Injected into animals in physiological doses, cocaine determines in them an extreme muscular excitation, followed by an insensibility exclusively of the surface, the deeper sensibility being preserved.

One of the most remarkable of the properties of cocaine is its vaso-constrictive action. We emphasize this fact and expose its divers consequences. Let us here only cite the elevation of the blood pressure. We dwell as well on its action on the centers of thermic regulation (cocaine heightens the temperature, Richet) and on the ocular apparatus (Mydriase).

Dangers with Cocaine. We now approach the dangers which the use of cocaine might offer. In the first place, there is syncope. We show its rarity and explain how easy it is to avoid it by employing the right dose on the reclining patient. The other phenomena observed, sometimes subsequent even to correct injections of cocaine, are slight and insignificant—slight tingling (pins and needles) of the extremities and greater loquacity. There is really nothing in local anesthesia by cocaine approaching the sudden frights which accompany the use of chloroform. Statistics bear us out in this statement. In 7,000 cases of anesthesia by cocaine practised by Reclus, he has not noted the slightest trouble in the physiological equilibrium. We ourselves, with a minimum of 15,000 injections, cannot register one accident not even an incident, due to the use of cocaine. We are, therefore, in a position to affirm that this is the most inoffensive of all the anesthetics and that it exposes one to no surprise whatsoever.

With the aim of avoiding the so-called inconveniences attributed to cocaine, its derivatives or congeneric substances have been experimented with, which subject is treated at length in our thesis. We will here limit ourselves to citing the conclusions we arrived at concerning tropacocaine and eucaine.

Tropacocaine. Tropacocaine presents an equal degree of toxicity while its anesthetic action appears less profound than that of cocaine.

Eucaine. Eucaine is a vaso-dilator, its injection is painful and it presents a feebler power of anesthesia and of a shorter period of duration than cocaine.

Cocaine Phenate. Phenate of cocaine, insoluble in water, and employed, therefore, dissolved in oil or liquid vaseline, produces nodules which are long in disappearing.

Therefore the use of chlorhydrate of cocaine appears to us to carry with it all the advantages claimed for the preparations compared to it as much from the point of view of the anesthesia produced as by the percentage of possible accidents.

(The author reports experiments with various vehicles for carrying the cocaine, such as oil, vaseline, cocoa-butter, etc., and reports adversely.)

Dosage and Solutions. Because of the reasons we have given, it is water we choose as vehicle for chlorhydrate of cocaine. It remains to determine what title to give this solution.

Cocaine being a toxic medicament, one should use as small a dose as possible, in spite of the fact of its being endowed with sufficient analgesic power. There is general agreement to-day to recognize a 1 part to a 100 solution as sufficient.

The toxicity of cocaine depends, not only on the weight of the quantity of the injected alkaloid, but also on the quantity of water in which it is in solution. The greater the quantity of water used, the more inoffensive it is for the same amount of cocaine.

For the extraction of a tooth, one cubic centimeter of a 1 part to a 100 solution—that is to say, one centigramme of cocaine quite suffices.

Schleich employs even a feebler solution: 0 gr. 002 and even 0 gramme 001. But in this case, the anesthetic is illusionary and due simply to the mechanical distension of the tissues; similar results can be obtained by a simple injection of distilled water.

Ordinarily for the extraction of a tooth we use one centigramme of cocaine. Under 12 years and above 60, we reduce the dose to no more than one-half centigramme. We have never had an accident and have yet always produced perfect anesthesia. In certain cases of complicated extractions, we inject as high as 2 and 3 centigrammes without accident, but conform, of course, to the precautions stated above.

We make use of fresh solutions, or extemporaneous solutions or of solutions preserved in sterilized ampoules.

We conclude that a cubic centimeter of a fresh and sterile solution of chlorhydrate of cocaine, one part to a hundred of distilled water, seems sufficient for practice in the majority of cases, and such a dose induces neither accident nor incident.

Precautions, Position, Counter-Indications. We lay stress on the precautions to be observed—the loosening of any clothes which might in any way impede respiration, a horizontal position, or, at any rate, one approaching the horizontal. There are



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contra-indications; as cocaine raises the blood pressure, it is contra-indicated for aortics and arteriosclerous patients.

Because of its depressive action, it ought also to be forbidden for anemic individuals and those debilitated, extremely nervous or averred neuropaths, and to those worn out with debilitating diseases. Should the patient present a general state which would seem to visibly predispose him to syncope, it were better to abstain. These contra-indications are not absolute, they are but relative, and the more to be observed as the disease seems to arrive at a more serious degree.

Instruments. As the gums offer quite a resistance to the injection, it is well to use a Pravaz syringe with a needle screwed on. Steel needles, by reason of their rigidity and the delicacy of their vent are preferable.

Sterilization. A great many of the accidents of infection attributed to cocaine are really due to aseptic faults. We keep our syringes in a carbolic solution (5 p. 100) with the piston drawn out, so as to keep the body of the pump and the piston-rod constantly in contact with the antiseptic liquid. The needles are to be boiled at least five minutes, or held in the flame.

The Operating Field. The mouth should be rinsed with boracic acid and water, the gum washed with alcohol.

The Injection. As the first puncture is liable to be somewhat painful, even with fine needles, we apply to the gum previously dried, a 10 p. 100 solution of cocaine, or else pulverized coryl.

After exposing the character of the tissues to be reached by the injection, we arrive at the following conclusions:

To insure the efficacy of the injection, it must be made at the level of the mucous membrane, which adheres closely to the periostium, and consequently not too near the neck.

The syringe, armed with the needle, is held like a pen and forced into the gum, not deeply, within the derma, at a point situated about equidistant between the free edge of the gum and the presumed spot where the point of the root should be, obliquely in reference to the median region of the maxillary. A sufficient resistance is felt when injecting and bit by bit the mucous membrane whitens under the influence of the cocaine.

One can be sure that the anesthesia will be excellent if the piston pushes hard. If the liquid enters without resistance, it shows that the injection has been made in the cellular tissue and the formation of an oedemous bulb will be determined. It were better then to withdraw the needle and begin again. Several injections are necessary, at least two, in order to surround the tooth with an anesthetized zone.

Adrenaline added to cocaine has given the best results, from the local as well as from the general point of view (Batlin and de Nevreze.)

Stovaine. Stovaine is a substance recently discovered by a French chemist, M. Fourneau, which offers certain advantages over cocaine.

1. Weaker toxicity. From experiments on rabbits and guinea pigs which we describe in our paper, it is shown that this difference of toxicity between the two substances is very great—in fact, cocaine is shown to possess twice the toxicity of stovaine.

2. That this new medicament possesses a vaso-dilatative action, while cocaine's action is vaso-constrictive. Consequently, with stovaine a patient may be operated upon, seated.

3. Finally, stovaine costs very much less than cocaine.

It is about two months ago since we began using stovaine—that is to say about the end of January, 1904, upon the advice of Prof. Reclus. This surgeon has been employing it for several months in his service, and has obtained perfect results up to the present.

Personally, we have made a hundred injections of a 0.75 p. 100 solution of stovaine. We have observed no menace of syncope, no sickness ensues and we can affirm that the anesthesia produced is equal to that produced by cocaine.

Conclusions. 1. Complete anesthesia, because of the dangers and inconveniences it entails, should be the exception in dental surgery. On this fact is based the importance of local anesthesia.

2. Of all the methods of local anesthesia actually known, cocaine seems to give the best practical results.

3. Chlorhydrate of cocaine appears to us superior to all the other preparations which compete with it.

4. Distilled water is the best vehicle proposed for the transmission of cocaine.

5. In general practice, a satisfactory anesthetic is obtained and all accident is avoided by the use of one cubic centimeter of a fresh solution, in distilled water, of chlorhydrate of cocaine at 1 p. 100.

6. When the injection exceeds one centigramme of cocaine, a horizontal position is called for.

7. In the extraction of a tooth, it is almost exclusively the rending of the alveolo-dental ligament that causes the pain.

8. The anesthesia is entirely dependent upon the manner of operating the injection. The after effects depend on the asepis.

9. After the operation the patient should remain reclining one-quarter of an hour for one centigramme of cocaine; from two to three hours for a larger dose.





On the Physiological Action of Somnoforme.

By DR. FLORESTAN AGUILAR, Madrid, Spain.

(Abstract of paper read at Fourth International Dental Congress, St. Louis, 1904.)

The discovery of Dr. Rolland, Director of the Dental School of Bordeaux, of the mixture which he has named "somnoforme," and which consists of ethyl chloride 60 per cent, methyl chloride 35 per cent and ethyl bromide 5 per cent, is, I consider, one of the most important clinical discoveries of modern times.

In order that an anaesthetic should enter the respiratory tract and act on the nervous centers, it must be in the gaseous form and the rapidity of its absorption is in direct ratio to its degree of diffusibility. This is the force which causes the blood corpuscles to become saturated with its narcotic vapors instead of oxygen; and, therefore, the action of the gas on the nervous system will be rapid in proportion to the rapidity of that saturation. Dr. Rolland presents the problem of anaesthesia in the following propositions:

First, to produce anaesthesia it is necessary that the tension of the anaesthetic gas be superior to that of oxygen, so that it may in a certain proportion take the place of the latter in the pulmonary alveoli.

Second, the tension of a gas being proportionate to its volatility, the more volatile the gas is, the easier can it be made to take the place of oxygen.

Third, the ideal anaesthetic, if such a thing would be possible, would be the one behaving in its conditions of entry, sojourn, and of exit from the body in the same conditions as does oxygen.

If we follow the course of oxygen in the body we see that the red blood corpuscles become charged with oxygen in the lungs during inhalation and distribute it to the tissues throughout the body. The blood corpuscles have their period of activity during the course through the arterial system. When the oxygen has been given up, the corpuscles return by the venous system inert and dormant back to the lungs, where by contact with oxygen they resume again their former lost activity. Now as about 25 or 30 seconds are necessary for a red corpuscle after leaving the heart to return to it, we can say that in this diagrammatic division of the circulation in two parts, one arterial and the other venous, the action of the oxygen would last from 12 to 15 seconds; therefore, an anaesthetic capable of being absorbed practically in the same manner as oxygen should produce its effect in about 15 seconds, and when the administration be discontinued the anaesthetic should be eliminated in proportion as the corpuscles

of the blood come again into contact with the oxygen. This almost precisely is what takes place with somnoforme.

Somnoforme has a powerful action on the great sympathetic nerve, increasing the arterial tension and the frequency of the cardiac contractions. A series of curves of the blood tension taken with the sphygmograph of Marey and the sphygmomanometer of Potain on the radial artery of Dr. Rolland, showed in 20 minutes a variation of from $13\frac{1}{2}$ of normal blood pressure to $14\frac{1}{2}$, 17, 17, 13, 14, 15, 14, 14, $13\frac{1}{2}$, during, through, and after anaesthesia. The pulse which formerly was 76 per minute, presented in the same observation a frequency of 76, 84, 76, 68, 68. Respiration, which when normal was 16 per minute, went up to 28, 20, 19, 20, 20, and careful microscopical study of the blood of subjects under "somnoforme" showed that that anaesthesia of from 5 to 15 minutes' duration produced no important modifications in the blood. The urine of the anaesthetized persons also remained normal.

Microscopical studies of the cerebral centers show the modifications produced by somnoforme on the neuron. (The neuron as is well known is the anatomical nerve element or the nerve cell and its branches as discovered and investigated by Ramon y Cajal of Madrid, composed of three parts; first, a central part which is the real cell with its protoplasm containing elements with and without peculiar affinity for coloring matter and its nucleus; second, a peripheral part made up of protoplasmic branches and the various ramifications (dendrites) with ends which do not anastomose; and third, a more peripheral part formed by the axis cylinders which do anastomose.)

Employ always a mask or inhaler in preference to a handkerchief or waterproof cone with which it was originally applied. The inhaler will permit not only the exact measurement of the dose employed, but also the rapid induction of anaesthesia by the total exclusion of air, a factor of great importance. After seating the patient with his head in line with the body, explain to him that he is to make deep inhalations, that the liquid has a slight irritating odor, and that it will produce a quiet and agreeable sleep, if he thinks of something pleasant. The pneumatic pad of the inhaler having been inflated and tried on the patient's face pour the somnoforme from the bottle into the chamber of the inhaler in a dose of 5 cubic centimeters or the contents of a capsule, such as they are sold by the manufacturer, close very rapidly the chamber of the inhaler and instantly apply the face-piece to the patient.

Generally in about 20 seconds the action of the agent will commence



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and the signs of complete anaesthesia will be seen by the cessation of the ocular movements, drooping of the eyelids, dilating of the pupils, complete relaxation, occasional rigidity of the arms, and loss of corneal reflex. The period of induction is completed in from 30 to 45 seconds and the anaesthesia lasts from 60 to 90 seconds. The pulse slightly increases in frequency and tension and the color of the face remains completely normal without traces of the cyanosis that appears when nitrous oxid is employed. When the patient commences to recover, analgesia persists during some seconds, allowing a little more time to operate with the patient in a semi-conscious state. In 4 or 5 minutes the patients completely recover.

In conclusion, I consider somnoforme the most valuable general anaesthetic in dental practice—by the rapidity of its induction (30 seconds) and the length of its duration (50 seconds), by the possibility of administering it to all patients and without especial preparation, by its pleasant effects and by its safety, demonstrated not only by the investigations on its action on the nervous centers, but also by a clean record of over 300,000 cases.

Italian Writers upon Dental Science and their Works.

By V. GUERINI.

(Abstract of paper read before the International Dental Congress at St. Louis, 1904.)

In Italy, much more than elsewhere, dental art has been, up to a very recent period, unjustly held in low esteem; even in these later days nothing serious has been done in the way of teaching; it is, therefore, not to be wondered at, if in the History of Dentistry, Italian names figure in scarce number as compared with those of French, German, English and American authors. In the course of these pages we shall see that some great Italian dentists have acquired celebrity in foreign lands, for, exactly on account of the low esteem in which the profession was held amongst us, they had abandoned Italy, despairing of ever being able to gain in their own country recognition and worthy appreciation of their talent.

The first author worthy of mention is Bruno Da Longobucco, surgeon of the School of Bologna; a treatise, written by him, towards the half of the thirteenth century was highly appreciated at the time of its appearance. The part relating to dental and gingival maladies is very brief. The author appears to us, as a great friend of the actual cautery and advises using it as a cure for dental caries, epulis, fistulae and cancer

of the gums. Nothing is said by him of instrumental removal of the teeth; instead he recommends, as a means of making a diseased tooth fall out, a paste of flour and the milky juice of the tithymal to be applied around its root.

Guglielmo di Saliceto. Another ancient Italian surgeon, Guglielmo di Saliceto, who was professor at Bologna and at Verona in the second half of the thirteenth century,

also says very little with regard to gingival and dental maladies and absolutely nothing referring to surgical intervention.

Lanfranchi. Lanfranchi, of Milan, one of the most celebrated surgeons of the thirteenth century, although he mentions the extraction of teeth in a treatise of his on surgery, shows himself but little inclined to the operation and prefers to combat dental pains by using narcotics. The extraction of molars, he considers, an especially dangerous operation.

Theodorico Borgognoni. Theodorico Borgognoni (1205-1298), also known under the name of Teodorico of Cervia, is the first author who speaks of salivation consequent on mercurial frictions. What he says about fistulae or of the maxillary region in general, is also worthy of remark. He warns that in every case of the kind it is necessary to pay special attention to the state of the dental roots; when there is exit of pus, the roots are certainly affected, and all the diseased teeth must then be extracted as quickly as possible.

Pietro di Argelata. Pietro di Argelata, or Della Cerlata, professor of surgery at Bologna in the fifteenth century, wrote a treatise on surgery in six books. In this work dental maladies are also taken into serious consideration.

He lays great stress upon the importance of cleanliness of the teeth, shows what serious injury is brought about by dental tartar, counsels its removal with scrapers, the file, and dentifrice powders, and even advises the use of aqua fortis for whitening the teeth.

He says nothing about the stopping of decayed teeth; however, he advises cleansing carious cavities with aqua fortis, or else enlarging them in such a manner as to render them less liable to become the receptacle of debris.

Pietro Della Cerlata treated dental fistulae with caustics and with arsenic. In cases of hard epulis of a malignant character, he advised simple palliative treatment; for soft epulis, of a benignant kind, he was averse to excision as likely to give rise to hemorrhage, and preferred instead tying the tumor, or else causticating it with boiling oil or other caustics till it fell off.



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**Bartolomeo
Montagnana.**

Bartolomeo Montagnana, another illustrious surgeon of the fifteenth century, who taught in the University of Padua, recommended a mixture of camphor and opium as an excellent toothache remedy.

**Giovanni
Plateario.**

Giovanni Plateario, professor at Pisa in the second half of the fifteenth century, cauterized decayed teeth with a lighted piece of the wood of the ash-tree, or with the red-hot iron; he held the cauterization to be much more efficacious if, before carrying it out, one filled the carious cavity with theriac.

Before extracting a tooth Plateario, too, as was usual, administered purgatives or bled the patient. He has the credit of having introduced the sitting position for the operations on the teeth, while previous surgeons made the patient lie in a horizontal position or held his head steady between their knees, as one reads of in Abulcasis and other authors.

**Giovanni
d'Arcoli.**

Giovanni d'Arcoli, known also under the Latinized name of Arculanus, was professor at Bologna and at Padua in the fifteenth century; he wrote a medical work of great merit and dedicated several chapters of the same to dental maladies, treating this subject with great thoroughness.

In speaking of the stopping of decayed teeth, Giovanni d'Arcoli says that it must not always be carried out with the same substance, but that in making choice of the material one should have regard to the temperament of the individual and to the condition of the gums, and of the tooth. However, that which is most particularly noteworthy is the fact that Giovanni d'Arcoli counsels filling the teeth, in certain cases, with gold leaf.

The use of gold in dental stoppings, therefore, dates back, at least, to 1450, the period at which Giovanni d'Arcoli's book was written. It is, moreover, to be noted that in naming this mode of stopping, he does not speak of it as an innovation introduced by him; indeed, he merely alludes to it in the briefest possible terms, which greatly contrasts with the ample and particularized manner in which every other subject is treated in the book. From this we may argue that gold stoppings were already in use before the time in which Arculanus wrote, and that he simply mentions a practice of the dentists of the time.

It is also to be noted that in Giovanni d'Arcoli's book we find the first mention of the instrument called *pelican*, which remained in use for so long a time, undergoing a great number of modifications and finally giving origin to the key of Frère Côme, the key of Garengot and the English Key.

Another circumstance, however, renders Giovanni d'Arcoli's book of

still greater importance for the history of dentistry. One hundred years after the date at which this author wrote, the German surgeon, Walther Hermann Ryff, published a pamphlet in which was spoken for the first time of dental maladies, their prophylaxis and treatment, independently of general medicine and surgery. Ryff is, therefore, considered as the initiator of dental literature properly so called, and his book, of which the copies now extant are exceedingly rare, has been the object of accurate study, especially on the part of Dr. Geist-Jacobi, who has made known to the dental world the contents of this old pamphlet, bestowing on its author the highest of praise. By comparing all the passages of Ryff's book made known by Geist-Jacobi with Giovanni d'Arcoli's work, I have been able to establish that it contains absolutely nothing original, for all that is worthy of note in it has been translated *ad litteram* from the work of the above named Italian author, written a hundred years before!

Ingrassia. Gian Filippo Ingrassia (1510-1580) was, perhaps, the first to make researches into the development of the teeth, and to discover the germs from which they are derived.

Matteo Realdo Colombo. Matteo Realdo Colombo, of Cremona, the successor of Vesalius in the chair of anatomy at Padua, combatted the erroneous belief that the teeth form in the alveoli only a short time before their eruption. Having dissected the jaws of a great many foeti, he observed that the teeth existed in them, for which reason he was able to affirm with certainty that the teeth begin to develop during the intrauterine life.

Gabriel Fallopius. The highly celebrated anatomist, Gabriel Fallopius (1523-1562), of Modena, made accurate and very happy researches about the development of the teeth; he published the results of his studies in a book, *Observationes anatomicae*, published at Venice in the year 1562, the same year in which he died.

By his investigations he demonstrated the fallacy of Vesalius's opinion that the permanent teeth develop from the roots of the deciduous ones. He was also the first to speak in clear terms of the dental follicle.

Fallopius also deserves the credit of having called attention to the analogy existing between the development of the teeth and of the feathers of birds, thus being ahead of Duverney, who demonstrated a century later that the teeth have in their mode of development a great analogy with all epidermic appendages (nails, hair, feathers, horns).



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**Bartolomeo
Eustachio.**

Another celebrated anatomist of the sixteenth century, Bartolomeo Eustachio, made long and most accurate researches on the teeth and on their development, and in 1563, published a work, entitled *Libellus de Dentibus* (Little Book on the Teeth), which is from every point of view a masterpiece and marks a notable progress in the anatomy, the physiology and the embryology of the dental system.

The high value of Eustachio's researches tempted a French surgeon to perpetuate a plagiarism, a fact which, so far I know, has never been unmasked, but which I myself have had occasion to verify. The name of Urbain Hémard has a certain celebrity in the history of dental art, as being that of the author of the oldest dental monograph published in France. It appeared in 1582, that is, about twenty years after Eustachio's book, and bears the title, "*Recherche de la vrai anathomie des dents, nature et propriétés d'icelles, ou est amplement discours de ce qu'elles ont plus que les autres os; avecques les maladies qui leur adviennent et les remedes.*" Now, by comparing Urbain Hémard's book with that of Eustachio, I have acquired undoubted proof that Hémard, instead of carrying out researches of his own on dental anatomy, as he has given to understand, merely translated, and for the most part literally, the most important portions of Eustachio's book.

This fact, which is very similar to the other already related with reference to Giovanni d'Arcoli and the German surgeon, Ryff, demonstrates the great esteem which the Italian authors enjoyed at that time, as well as the great influence they exercised on the early period of the development of dental science.

I will now allude to some Italian dentists who gained high reputation abroad and who wrote remarkable works on dentistry in the language of the countries wherein they had taken up their abode.

**Bartolomeo
Ruspini.**

One of these dentists was Bartolomeo Ruspini, who practiced in London with great success for above thirty years; he was patronized by all the greatest personages of the kingdom, and by the royal family as well, from which he received special marks of distinction. He acquired so conspicuous a position that he was able, with the product of his work, to found an orphanage that was called by his name, being moved to do this by his great love for children, whose dental maladies and disorders had always been, during his lifetime, objects of particular study for him. In 1768 he published a treatise on the teeth, their structure and various diseases. This book was remarkably well received and went through a number of editions, the last in the year 1797. Ruspini did not, in reality, contribute very much to the development of dental science. He is, however,

to be specially remembered as the inventor of a very good mouth-mirror, a means of examination which afterwards gradually came into general use.

Another Italian, Ricci, acquired great celebrity at Paris, where he practiced at the end of the eighteenth and beginning of the nineteenth centuries. He introduced notable improvements into the manner of inserting pivot teeth, the construction of springs for artificial dentures and into other parts of odontotechny. He was also the author of several works, the most important of which was his "*Principes d'Odontotechnique*" (Principles of Odontotechny), published in the year 1790.

The Italian dentist Maggiolo, in collaboration with the French physician Jourdain, published a work of considerable merit at Nancy in 1807, entitled "*Manuel de l'art du Dentiste*" (Manual of the Dentist's Art). This book, written for the most part by Maggiolo, is almost entirely dedicated to dental prosthesis, which subject had never been treated in a detailed manner by any one before him; Maggiolo's work may, therefore, be considered as the first of its kind. The book was intended to serve as a practical guide to students of dental art, principally in all that relates to prosthesis; and it must without doubt have been of the greatest use, for the clear, precise and complete manner in which dental prosthesis is therein treated. According to Prof. Lemerle, of the dental school of Paris, Maggiolo was the first "prothésiste" of his time, and his book gave a powerful impulse to the progress of dental prosthesis.

Amongst the Italian dentists who practiced in other countries, the name that takes first rank in the history of dentistry is that of Fonzi, for he, as is well known, had a most important share in the invention of mineral teeth. This invention is generally attributed to Dubois de Chemant, although some consider him as a plagiarist and declare the chemist Duchateau to be the real inventor; finally, others say that both of these were merely precursors of Fonzi, to whom the credit of the invention is practically due. Impartial justice, however, obliges us to say that this important invention is due not to one alone, but to all three of these men. In fact, Duchateau was undoubtedly the first who had the idea of making porcelain dentures; Dubois de Chemant first succeeded in putting the idea into practice, but the prosthetic pieces of his making were in one sole block of porcelain that represented at the same time the teeth and the gums. Fonzi, finally, manufactured mineral teeth properly so called, that is, separate teeth intended to be fixed on to metallic bases. Dubois de Chemant's system of manufacture was as inferior to that of Fonzi as printing with wooden blocks was compared with separate type. While Dubois de Chemant only made den-





tures for given individuals, Fonzi manufactured as is done at the present day, assortments of mineral teeth with which dentures could be constructed for any and every one.

These teeth were furnished with small clamps of platina, inserted in the mineral paste before it was baked, by means of which the teeth could be soldered to the metallic base. No one had ever had the idea of manufacturing teeth of this kind before Fonzi; besides this, he found out how to imitate the semi-transparency peculiar to human teeth and to give a great variety of shades to the paste, so as to be able to make the mineral teeth harmonize in color with the natural teeth of the various individuals. In fact, Fonzi introduced enormous improvements into dental prosthesis, as we learn from his own writings, and as was fully recognized by the Academie de Médecine, and by the Athénée des Arts of Paris, which latter body conferred on him a medal and a crown in recognition of his high merits.

I have here essayed to prove, and I hope successfully, that notwithstanding the relative poverty of her dental literature, Italy has largely contributed to the development of dental art and science. Three names alone, of those cited by me, are sufficient to prove this—that of Giovanni d'Arcoli, the first author who speaks of gold fillings; that of Eustachio, whose excellent treatise on the anatomy of the teeth represents a record in the history of dental science, and that of Fonzi, who, as we have just seen, was the first to manufacture mineral teeth to be mounted on metallic bases.

The Value of Dental Legislation.

By DR. ANEMA, Batavia, Java.

(*Abstract of paper read before the Fourth International Dental Congress, St. Louis, 1904.*)

The interests of one individual are often opposed to the interests of another. The interests of a number of individuals belonging to the same class can, to some extent, be opposed to the interests of the rest of men. According to the well recognized principle, "The greatest good to the greatest number," the interest of the class must be subordinate to that of the mass, i. e., the general public; yet it has sometimes happened that the power of a class was so well organized that for a long time the interests of the minority predominated those of the majority.

We find this condition where a certain class has been long enough in power to make the laws of the country.

Allow me to ask you the following question: What do you consider

the true value of dental legislation and what may the public expect from it?

In the case before us of the public interest vs. dental legislation, allow me to introduce as the principal factor making for ill "professional egotism," a spirit related to self-preservation of the class on one side and professional jealousies on the other. Here I must diverge a moment to make myself better understood.

To my mind there is no more doubt of the existence of professional egotism than there is of a certain kind of patriotism, called "jingoism," that preaches, "My country, right or wrong," or of that egotism which, by instinct and brute force, extinguishes weaker races. Of the latter we have in the history of mankind many instances. Of the former, I hope to give you an instance later on.

All these forms of egotism are brought about by instincts of the individual becoming active in the mass at certain times and intervals of its existence.

Among the strongest instincts of man is the one of
Self Preservation. self-preservation. It is a common truth that instincts are hard to deal with, if indeed they can be dealt with at all. They may become concealed to the inexperienced eye, covered by today's civilization, which often times is not much more than a social veneer, or by an amiable self-deceit of good-natured and well-to-do people who believe that at least among their classes, instincts, and especially the one of self-preservation, are rudimentary. If, however, those less critical believe that the better classes look out mainly for the interests of others, then to my mind they are mistaken. The lesson given nearly two thousand years ago, "Love thy neighbor as thou lovest thyself," is still generally applicable, which implies its reverse that as a rule man looks out more for his own interests than for the interests of others. I will say, however, that there are no exceptions to this rule, such people as martyrs, where the instinct of self-preservation seems almost lost, but this specimen is very rare. This exception shows up more clearly the rule that says: "The instinct of self-preservation is stronger than the instinct of altruism."

When a man joins a profession he brings his instinct of self-preservation with him. This brings him often in closer contact with the profession, as he hopes that the profession may at a time be of some use to him.

The following is a direct proof of the existence of such an instinct. In a certain country a society of dentists, forming the editorial staff of a dental journal, desired to change the rules. One of the members proposed the following as the principle on which the new structure should be erected: "The society intends to serve the public by promoting dentistry in the most remote sense of art and science." His obvious reason, as he



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explained at the time, was to have as the leading motive the "interest of the public." After having been carefully considered, the proposition was rejected almost unanimously. So far as the thoughts of the opposition could be understood, the men who voted against the public interest proposition, feeling themselves representatives of their profession, considered it their duty not to look out, at least, not in the first place, for interests other than those of the body of men represented. The new rules are now based upon a foundation which can easily be laid bare and understood by looking upon the flag and emblem of some of our best dental journals which says, "devoted to the interests of the profession."

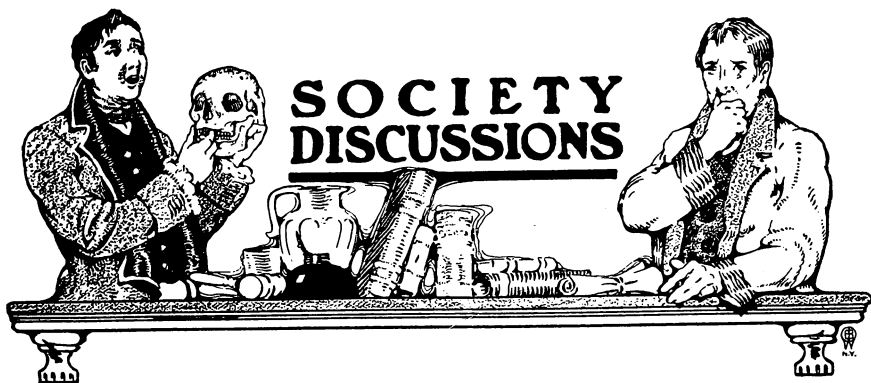
As dental journals are leaders and at the same time the voice of the profession, I consider these facts as valuable ones and as a proof that the dental profession needs devotion to its own interests. And as devotion to one (the profession) excludes devotion to another (the public) otherwise it is no devotion—what else can be the cause of the demand of this highest form of affection than the instinctive self-preservation of the class named, professional self-preservation.

In France a body of over two hundred and fifty dentists, the "*Syndicat des Chirugiens-Dentistes de France*," use power to bring before court respectable foreign dentists for using legally acquired but foreign degrees of doctor. As their country does not furnish a dental doctor's degree, the dentists claim that the foreigners gain an undue reputation by the use of that title, thus doing harm to the interests of the local dentists.

That this feeling is more or less common to all lands was illustrated in a conversation bearing on educational matters I lately had with a dental professor in Europe. In replying to a doubt expressed by me as to the advisability of the bachelor's degree and the official medical studies, and the detriment they might work in debarring many from entering the school and in denying the blessings of dentistry to the masses, he said, jokingly, "Oh, we don't need any more dentists here."

After this I hope to be understood when I repeat professional egotism is an ill-natured feeling related on one side to the self-preservation of the class and on the other to professional jealousy.





Fourth International Dental Congress.

The Fourth International Dental Congress was held at the Coliseum Building, St. Louis, Mo., August 29th to September 3, 1904.

**First Day.
General Session.**

The session was opened by an invocation of the Divine blessing, by Rev. Dr. Gregg.

An address of welcome was made by Hon. Howard J. Rogers, Director of Congress.

**Dr. Holly Smith,
Baltimore.**

It is more than pleasant for those who have been interested in the organization of this Congress to hear public commendation of the work of the committee. Townsend, in a little book entitled "The Art of

Speech," quotes from an unknown writer, the following:

"The apple of discord has been thrown in our midst, and unless it be nipped in the bud, it will burst into a conflagration that will deluge the world."

I cite this quotation, because it is my personal desire that you should not regard this evidence of contention as a serious matter. It may be that some frugal member of this association, as this city is not located far from the apple belt, has an apple or two in his pocket; but it is not the kind of apple to start a fire with, nor (if there should be some little feeling) is there any probability of that deluging the world or interfering with the work of this Congress! I have personally known some of the members of this organization committee for a number of years, the chairman, especially, before he became a practitioner of dentistry. I have known him to be an honorable, upright, conscientious and energetic man in all his work, and I feel that this Congress will do itself credit, and do the graceful thing in honoring the man who has borne the brunt of the work.



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I therefore move, Mr. Director, that the action of the Nominating Committee, in naming for the Presidency of this Congress, Dr. H. J. Burkhardt, be confirmed, and that he be elected the President of this Congress.

Dr. Hofheinz seconded the motion. The motion was then put, and Dr. Burkhardt was declared elected. Upon motion of Dr. C. N. Johnson the vote was made unanimous.

Gentlemen of the Fourth International Dental Congress: I thank you deeply for this expression of your confidence, and for confirming the action of the Nominating Committee, and the work which that committee has tried to do conscientiously and for the interests of this Congress.

The next order of business will be the election of Secretary-General of the Congress.

President Burkhardt invited all the Honorary Presidents, Honorary Vice-Presidents and Foreign Delegates to take seats on the platform.

Dr. James Truman nominated Dr. Edward C. Kirk, of Philadelphia, for Secretary-General of the Congress.

Dr. Kirk from the very inception of this Congress has done the largest part of the work connected with it. He has worked faithfully up to the present moment, and he resigned from the Secretaryship simply because he found that the committee had decided to elect officers permanently. He felt that no committee could or should elect those officers.

The question comes up now whether you will elect the man who has done so much for the Congress, or elect some one else. Personally I have no objection to that some one else; but I have an objection to allowing an individual who has accomplished so much to be overlooked by this Congress. I do not personally care who are the officers of this Congress. My object in being here is for the scientific advancement of the dental profession.

Upon a vote being taken, Dr. E. C. Kirk was then elected Secretary-General of the Congress.

I thank you sincerely from the bottom of my heart for all that this means of personal regard and personal confidence. Besides, it represents, I believe, an allegiance to the principle which has been so gracefully ceded by the Committee of Organization, namely, the right of every man to express his view upon this question.

The name of Dr. Mark F. Finley, of Washington, D. C., was then placed in nomination for the office of Treasurer, and he was elected.

Dr. C. S. Butler, was elected chairman of the Finance Committee.

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President Burkhart then presented Dr. C. N. Johnson, of Chicago, and requested him to address the audience.

This is entirely a surprise to me; but I do want to
Dr. C. N. Johnson. thank most heartily your presiding officer for giving me the pleasure of seeing your faces and greeting you here, and I beg you to make this the best dental meeting that has ever been held in the history of the world.

If perchance there has been any feeling developed, let us crush it out at this moment as one man, and do the best we can for dentistry.

Secretary Kirk read letters of regret from the Governor of Missouri, Hon. A. M. Dockery, and the Mayor of St. Louis, Hon. Rolla Wells.

Dr. Chas. C. Chittenden, of Madison, Wis., President of the National Dental Association, made an address of welcome. Dr. Burton Lee Thorpe, of St. Louis, welcomed the Congress on behalf of the State of Missouri.

Dr. A. W. Harlan, vice-president from America, of the International Dental Federation, then welcomed the foreign dentists, and presented the following representatives from their respective countries: Dr. Otto Zsigmondy, of Vienna, Austria; Dr. Rudolph Weiser, of Vienna, Austria, Official Delegates of the Union of the Societies of Stomatologists of Austria; Dr. Alfred Burne, of Sydney, N. S. W., Australia; Dr. James M. Magee, of St. Johns, N. B., Canada; Dr. E. Sauvez, of Paris, France, (Dr. Sauvez is the representative of the Government of France, and also Secretary-General of the International Dental Federation); Dr. W. D. Miller, of Berlin, Germany; Dr. John E. Grevers, of Amsterdam, Holland; Dr. V. Guerini, of Naples, Italy; Dr. J. Rojo, of Mexico; Dr. Losada, of Madrid, Spain; Dr. L. S. Bryan, of Basle, Switzerland; Dr. J. Y. Crawford, of Nashville, Tenn., representing the United States Government; Dr. Tignor, representing the Army Dental Corps, U. S.; Dr. J. M. Whitney, of Honolulu, Hawaii; Dr. Louis Ottofy, of Manila, Philippine Islands; Dr. Salvatore Proto, of Uruguay; Dr. J. W. Noble, of Hong Kong, China; Dr. Benjamin Bedoura, Nicaragua; Dr. Hendrickson, of Christiania, Norway. President Burkhart then made an address, after which Dr. Godon read his address.

In behalf of the Committee on Prize Essays, Dr. Truman announced that the prize had been awarded to Dr. W. D. Miller, of Berlin.

Dr. N. S. Jenkins, of Dresden, Germany, made a few remarks, and after some announcements by Dr. Conrad, the meeting adjourned to 10 o'clock Tuesday morning (August 30th).

Second Day. President Burkhart called the meeting to order about 10:15 o'clock.

A paper by Dr. George Viau, professor in Ecole Dentaire of Paris,



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and entitled "Apropos of a Portrait of Pierre Fauchard" was read by Dr. T. W. Brophy, of Chicago.

Dr. John S. Marshall then read a paper on the subject of "The Dental Corps of the United States Army."

Discussion on Dr. Marshall's Paper.

The facts and figures are such as to command our most serious attention. I take the ground that if a man is sick in his teeth, he is equally as sick as in any other part of his body, and it demands equal treatment for that disease. The time has come when these brave boys of ours, who go out to defend our homes and our honor, should be physically prepared to do so. They should have the same treatment and consideration as that of any others for whom we care. (Applause.)

It is appalling to think that only twenty per cent receive attention; but now we have come to the period when we demand that one hundred per cent—officers and privates—shall receive proper treatment. Heretofore, perhaps, we have not been in a position to take this stand. It has been said we were "only dentists." We mean in the future that when you say "dentist" it shall mean a man qualified to know everything that is requisite to treat the human body. We have taken the position here, since the National Board of Examiners met, that the young men coming into our profession shall have a preliminary education equal to that required to enter the freshman class of any university of this country. (Applause.)

I take pleasure in stating that while studying this subject in other countries, I have found that it is essential that every physician and surgeon who enters the English Army at the present time, shall have taken a course in "Diseases of the Teeth" as the English call it. Every surgeon who enters the Spanish Army must have a course in dental pathology that he may recognize and be qualified to relieve the distress to which the soldier and sailor may be subject while in the service of his country.

I hope we will look upon this from a broad point of view, so our discussion may bear upon the soldiers and sailors of all countries. I hope this Congress will take up the matter and pass resolutions as an expression of opinion that Army and Navy dentists shall be appointed for the soldiers and sailors of whatever flag.

Dr. W. D. Miller, of Berlin, Germany, read a paper entitled: "Researches Relating to Various Pathological Processes in the Teeth," before the Congress at a session in the large hall. (It was understood that Dr. Miller

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gave only a synopsis of his paper, which will appear in full in the Transactions.)

Discussion on Dr. Miller's Paper.

Dr. Black.

The points in the paper are valuable to science, and will have their influence in the future in the formation of the ideas of the dental profession. I would have liked to have a few of the specimens to throw on the screen, but I can recall them to your memory, in order to enforce one or two ideas that I wish to mention. It is particularly in reference to those that show the undermining of the enamel by decay. Acid has obtained access to the dentine through a fissure, through a deep pit, or else where lodgment occurred. It has burrowed rapidly into the enamel, and finally the enamel decayed from the inside outward, while it remains perfect outwardly. We have the confinement of an acid in a certain place by the surrounding structures, while upon the outer surface immediately adjacent there is no action of an acid.

This should create an impression at once upon the minds of every one here, that the confinement of an acid upon the surface of a tooth, it being produced in this confined space, is one of the pronounced phenomena of caries.

Placques.

This brings me to say a few words in regard to plaques. Taking the expression of plaque as given by Dr. Williams, Dr. Miller is correct. I have seen a mass of micro-organisms covering over the teeth for months and years together and no decay occurs. This is not the plaque I mean. Dr. Miller says he has never seen the plaques I have mentioned. I hope he will find them. The plaque I have mentioned is a transparent mass, so transparent that when the teeth are cleaned and the plaques remain you will not discover from an examination of the teeth with the eye that there is any plaque, it is so transparent; but if you begin with a sharp blade at one edge and peel off carefully, flooding with water at the same time, you will peel off a plaque that presents a yellowish tinge in the light. That is the only plaque I have spoken of as having an influence in the progress of caries. It is not found generally; it is only in mouths where decay is progressing rapidly. I have grown this plaque artificially, and seen it in large masses, and I know that under certain circumstances of dietary condition this plaque is produced while it is not produced otherwise. Until Dr. Miller has seen this plaque and examined it, I do not expect him to believe otherwise than as he has spoken today.



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Localization of Caries.

Why is caries localized upon certain points upon the teeth? First, because of the opportunity for lodgment in fissures and crevices—the opportunity for the confinement of that growth in certain points. Why is it found in pits and grooves; on approximate surfaces where the teeth come in contact, making a place where the teeth are not cleaned; in places near the gum where the teeth are not cleaned? Ninety-nine per cent of the cases occur in those three localities. Why this localization? I wish to bring this prominently before you, that—excepting those cases which only prove the exception—teeth never decay except in these unclean regions, and in the regions where the acids produced make it confined to the locality. In other words, the acid saliva never becomes so acid—with the exceptions I have mentioned—as to produce decay or as to act upon the teeth. It requires this confinement. I have made experiments in immune persons as to the production of decay by cementing on bands and leaving them too long; the cement either not being well placed in the beginning or having dissolved out, I had a ring of decay nearly as broad as the bands, no other decay occurring anywhere in that mouth, simply from the confinement of that acid. We will have to account for that confinement of the acid in these localities before we have all the phenomena of decay in our minds. I should not say there is no decay without the bacterial plaques I have spoken of. We can produce it artificially in mouths that are otherwise immune. I speak only of the point—the confinement of the acid in one particular locality.

Such workers as Dr. Miller, Dr. Michaels and others, who are attacking this problem and giving us the information they derive from their experimental work, will in the future—after some of us are dead and gone—unravel those facts so they will stand out clear. Let me say to you, gentlemen, those who may regard this as a scientific question purely, that they are questions upon which our operations are based. They are the practical questions of the future—the questions of most importance to us and our patients. We will change our practice if necessary to meet the requirements, and the result will be a better service to our people.

I do not regard as yet—perhaps I may do so when I read the paper more thoroughly—the differences of solution of different teeth as being prominent enough factors to account for the occurrence of caries in the teeth of different persons. That there is a difference is true. It is certainly the case that secondary dentine deposits are not acted upon as readily as normal dentine. Dentine that is full of interglobular spaces decays much more quickly than normal dentine. It is true also that most secondary dentine is comparatively without dentinal tubuli, and acids

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cannot penetrate so quickly as in dentine that is full of spaces. The facts as shown by Dr. Miller today are correct. How are we to interpret the facts until we have all of the circumstances surrounding them. The question of diathesis is of great importance in this connection, and it is not a question as to whether micro-organisms grow in the mouth. I have never yet seen the human mouth in which micro-organisms were not growing, and I think Dr. Miller will admit the same thing. They are growing in the mouths of every one of you whether you have decay of the teeth or not. There is something in the diathesis that gives those micro-organisms the power to act in one case and robs them of the power in another, and we must continue with the search until we find the cause of it. Until we do, we have not finished our work in this direction. I suppose there is no one in this audience today and perhaps very few dentists in this country or Europe, who question the fact of the bacterial cause of decay, as developed by Dr. Miller twenty years ago. We should even yet thank him for that with a rising vote.

Dr. James Cruman,
Philadelphia.

When I rise to discuss a subject of this character, I like sometimes to be in opposition, and not to discuss facts. I believe this paper goes down to the foundation of things, and gives us facts of which there can be no dispute. I have been interested in this paper for a number of good reasons, and especially because it has demonstrated in my opinion that the so-called plaques are not productive of caries. I feel that the illustrations shown on the screen today fully and completely upset that theory, and I cannot understand Dr. Black's idea that Dr. Miller has not reproduced plaques as he has seen them. If Dr. Black is so sure that the plaques, as he understands them, have not been represented on the screen today, it becomes his duty to at once go to work and demonstrate to the dental profession that he has seen something else. It has no doubt been upon the minds of many, that the so-called transparent zone of Tomes was not of a character to prevent the action of caries. You saw today on the screen that it does prevent caries. I have studied this matter for many years in regard to this so-called transparent zone. I believe thoroughly that this zone in slow caries is the result of the filling up of the tubules with secondary tissue. As Dr. Miller has demonstrated today the secondary formation resists the action of caries more than normal dentine. We find that represented very carefully in teeth where caries does not act as in ordinary normal caries, and we have not only secondary dentine there, but abnormal dentine.



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Effect of Nitrate of Silver Upon Caries.

I was also pleased with the statement that nitrate of silver has no effect on caries; that it does not prevent the action of caries on enamel. That does not demonstrate the fact that it does not have effect on caries in dentine, but upon enamel. I have long been satisfied that the theory that has gone broadcast in our profession that by washing the mouth with nitrate of silver we prevent the action of caries in the future, is not correct. I am personally satisfied that the result of Dr. Miller's work will cause a revolution in our profession in regard to this matter, and I am gratified, as one who had something to do with his paper, that this meeting will indorse the action of the committee that gave him the honor of the prize in this Congress for his essay.

Dr. Calbot, Chicago.

I wish to congratulate Dr. Miller upon his excellent paper. His slides certainly represented and brought out fully the work he had accomplished. It would be strange, however, if we did not differ from one another. I think Dr. Miller would feel rather hurt if we came to this meeting and merely patted him on the back and said he had a magnificent paper.

The views brought out by Dr. Black and Dr. Truman, together with Dr. Miller's paper, put to me a different light upon some of those points. If we are going to study the decay of the teeth, we must take it up from a broader standpoint. We must not look upon conditions in and about the teeth only. What Dr. Black and Dr. Truman and Dr. Miller have said, prove to me that other conditions must be taken into consideration.

Effect of Degeneracy Upon Caries.

In the evolution of man, the teeth are growing smaller, and they are degenerating. The shapes of the teeth are changing, and this degeneration has as much as and I believe more, to do with the decay of the teeth than any one thing. Degeneration takes place in the dentine as well as in the enamel, and there was not a single slide shown today which does not show degeneration in structure.

In the nervous system must we look for a healthy development of the teeth? If a mother is not nourished properly, or if from worry her tissues are not well developed, it is impossible for the fetus to be well developed; hence we have degeneracy in all its forms, and in every one of those cases shown on the board there are degenerate structures. Dr. Black spoke very nicely of the difference in structure. A patient comes to you to have his teeth put in a healthy condition. He is taken with typhoid fever, or pneumonia, or any of the constitutional diseases where his system is poorly nourished for six months or a year. Let that patient

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return to you and you will find a difference of structure, and a discoloration in the structure. In my own family a relative has died, and the wife has had a change in the structure and color of her teeth. Any grief and any worry from any reason will cause the structure of the teeth to change, and decay will take place.

Fill the teeth of a young lady, send her to a boarding school, let her return in the Spring of the year after school is closed, and you will find not only new cavities, but decay around those filled. The dentist who has been in practice a long time says your fillings are poor. I do not believe it; I think you put in as good fillings as was possible; but because of the extra amount of work that this young lady has had to do, her nervous system has been overstrained, and a change in the structure has taken place.

I cannot give you all the points that Dr. Miller and Dr. Black have mentioned; but I think the nervous system has more to do from the embryo up than any one thing. We must look to the diathesis, as Dr. Black has beautifully brought out along this line.

I have been interested in this work from my first recollection of dentistry. There are several points to be discussed with a great deal of benefit to this audience; but time will not permit my going into any detail. Dr. Talbot brought out the point in regard to the physiological change of the human being as a factor. I do not believe tooth structure has changed as much as the fluids of the mouth have changed, and consequently changed the physiological activity of the microbe. I believe that is one of the main factors. While we appreciate the development of the tooth structure as to its physical character in general, there are lots of changes in the life process of the individual that must necessarily alter all the fluids of the body. We can illustrate an instance of diphtheria; we have an individual who is today immune to the action of the Klebs-Loeffler bacillus, and tomorrow he is susceptible to it. The conditions are such, not only constitutionally, but the fluids of the oral cavity have changed, and lowered the vital resistance of the mucus surfaces. The teeth do not change as does the epithelial structure of the mucus surface; but the secretion of that mucus surface changes. If such is the case, we are of the belief that the changing of the culture media in these organisms is due to perhaps the causes Dr. Talbot has mentioned—nervous conditions; but I do not believe the teeth change. I have never seen any evidences that the tooth structure would change to the extent that would make any perceptible difference. In some experimental work I have done, I am convinced that the organisms that live in the oral cavity undergo various physiological changes, and as a result they are changing in the quantity



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of acid that they can produce, or other toxic conditions that are so prevalent.

Dr. Miller, I believe, has the honor of at least placing this subject on the firmest foundation of any pathological condition we know of at the present time. There is no pathological condition of the human race, of whose cause we feel as certain as in the case of decay of the teeth.

All honor is due to Dr. Miller's research, and his constant work in bringing us to the foundation that we can at least work from.

I want to thank Dr. Miller for his contribution to this Congress. To tell him how much we appreciate his coming here, is unnecessary; the size of the audience indicates that. We are proud of the fact

that he has placed this question upon the most scientific basis of any question we have.

I wish to thank the gentlemen who have so kindly discussed the paper, as well as all the gentlemen who have come to hear it.

I know of no man who is more worthy of our esteem than Dr. Black. I hope some time I will be in a position to have him demonstrate the plaque in the sense in which he understands it. I agree with what Dr. Black said as to its being confined in a certain area.

I thank Dr. Miller in the name of the Fourth International Dental Congress for the magnificent paper he has presented to us today.

Twenty years ago, Dr. Miller first demonstrated to the dental profession the bacterial origin of dental caries. In the twenty years that have elapsed since the publication of his article, it has been demonstrated that the correctness and the great value of that work have become more and more impressed upon the minds of men.

It seems to me fitting now that in Dr. Miller's presence we, in Congress assembled, express the fact to him and give him our most hearty appreciation and thanks for that work.

I move that this be embodied in a resolution, and that we pass it by a rising vote.

The resolution was unanimously carried amid great applause.

Dr. Platschick then showed lantern slides representing the early work of Pierre Fauchard.

Adjournment.

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Fourth Session. Dr. Crawford read a report of the Committee on Resolutions. A resolution in regard to organized dental service for the poor was adopted.

Dr. Crawford also presented a resolution to the effect that whereas the Fifteenth International Congress of Medicine to be held in Lisbon, Portugal, had made no provision for a section on Odontology and Stomatology, that the Congress be asked to recognize such department and provide for the same. The resolution was adopted.

Dr. Crawford presented a resolution in regard to an international commission being established for a nomenclature which shall be interchangeable and translatable into the English, German, French and Spanish languages—to report at the next international dental congress. The resolution was adopted.

Dr. Crawford presented a resolution heartily indorsing the labors of Dr. Williams Donnally in regard to obtaining proper dental service in the army and navy, and stated that the committee recommend the adoption of the resolution presented by him.

The resolution was carried.

I think you will all be in accord with me in
Dr. Charles Godon. giving a vote of thanks to the officers and members from foreign countries, who worked during these four years, from 1900 until this meeting of 1904, traveling and coming together at Paris, Cambridge, Stockholm, Madrid and St. Louis. I move a vote of thanks for all the collaborators of the International Dental Federation during those four years.

Motion carried.

Dr. Kirk presented a communication addressed to the President and members of the Fourth International Dental Congress, as follows: "In the year 1909, the National Dental Society of Germany celebrates its fiftieth anniversary in Berlin; and it was decided at the meeting at Strasburg, to invite the Fifth International Dental Congress to hold its meeting in connection with theirs."

Dr. Kirk offered a resolution, seconded by Dr. Brophy, that when we adjourn, we adjourn to meet as the Fifth International Dental Congress, in Berlin.

Motion carried.

Dr. E. S. Talbot, of Chicago, read a paper entitled: "Anatomic Changes in the Head, Face, Jaws and Teeth in the Evolution of Man."

Dr. Talbot's essay received first honorable mention in the contest for the prize essay. The paper was illustrated.



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Discussion on Dr. Calbot's Paper.

**Dr. Hungerford,
Kansas City, Mo.**

I would like to have the members of the Congress ask themselves towards what does this paper tend? It is an exposé of facts and from those facts is drawn the conclusion of evolution as from the anthropoid ape, or from the negro type, or the Chinese type or any other type of, I might say, a degenerate race. Spain is degenerating, so is France. England is on her decline. Anthropologists have shown that the Caucasian race never evolved from the anthropoid ape, but that the anthropoid ape is a degenerate human being. Not only is that accounted for in all science, but in all history, in all Scripture and in all knowledge that I know anything about.

I did not gather just what the essayist was trying to prove. He illustrated certain facts and they seem to tend toward the idea that man was evolved from the anthropoid ape—an idea that I most seriously wish to controvert. I have the authority from Scriptural work and from the greatest scientists.

You cannot take ten gallons out of five gallons. You cannot take the higher out of the lower. You cannot evolve an ape that has no god in it; but a god can lose his god-head and degenerate and become an ape.

Nature gives expression to the soul of a man from her outward manifestation. When beauty takes its departure from a human face that face shows the way by which beauty took its departure—whether from dissipation, sexual indulgence or drink.

The wayside weed having its little soul undeveloped, develops itself as far as it can, and expresses itself in the coarse leek or unfragrant flower. The higher type of flower or animal expresses itself in outward form, and when you find faces perhaps beautiful in their childhood that are now blotched and sallow, you know somewhere in that person's life his thoughts were so far degraded that Nature stamped upon his face the truth expressed in that saying, that there is no secret but it shall be revealed. We reveal our characters in our thoughts every day, and show them up in our faces.

Dr. Thompson. I understand that it is along pathological lines that the Doctor argues, and I hope we will have more studies as contributing to what we might call the gap between cause and effect. These changes are the result of retrogressive change. This paper is a contribution towards the elimination of the neurasthenic conditions.

Dr. Calbot. It is the hardest thing in the world to make a person who has not given much thought to the subject understand what is meant by degeneracy. A person may have an arrested development of his brain. Then we have a

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degenerated being such as a criminal—a thief, a liar, etc. But we have degenerated structures, too. Man cannot develop without losing some structures. The little toe, the little muscles of the ears, the vermiform appendix, are not being used, and Nature is getting rid of them for higher development. The brain is developing in the human race. Certain nations have become arrested in their development, and they are dying out. That is correct. A nation will go on to a certain period, and if there is no new blood infused into it from other nations, it will soon die out.

In America we have the advantage over every other nation in the world. People pour in from every quarter of the globe. We are intermarrying, constantly furnishing new blood, and brains are developing and this will continue until a certain time when nations shall cease to emigrate, and we intermarry among our own relations as among the royalty in Europe, and then we shall have degenerate conditions.

We do most of our work by machinery now. We do very little with our teeth. We do not hold on to trees with our teeth as the lower animals. The physical part of the human body is degenerating, and the brain developing. That is why we have these degeneracies of the face. That is why we have irregularities of the teeth. We are not studying decay of the teeth; we are only studying it in the individual, not as a nation or a family. Every nation that comes into this world will have more decay of the teeth than the generation before. Irregularities of the teeth will become more common as we ascend the scale of evolution, because of the recession of the jaws, and because we do not use them.

This is a broader conception of the whole study. Decay, irregularities, interstitial gingivitis, are all based on the law of economy of growth, whereby an organ is lost for the benefit of the whole structure.

Adjournment.

Final Session.

The President, Dr. Burkhart, called the meeting to order at 11 o'clock a. m.

President Burkhart.

This is the closing session of the Fourth International Dental Congress, and many of the principal members are on the platform. We shall all be pleased to have them address a few words to us.

Dr. H. F. Thompson, Copeka, Kan.

I presume it may be said I represent to a certain degree the western part of the great Louisiana Purchase. I come from the great prairies of the West, and I appreciate the honor of being elected to this office. This celebration is the centenary of the acquisition of this great territory. I have thought if Napoleon had the same grace and courtesy that our distinguished representatives from France have, no wonder he inveigled Thomas Jefferson into buying this little piece of real estate.



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**Dr. Chittenden,
Retiring Pres. of the
Nat. Dental Assoc.** I congratulate the officers of this Congress, the Organization Committee, and everybody connected with the various sections upon the success that has followed their work. The National Association appointed a committee, and the National Association is entirely satisfied with their work.

**Dr. Boardman,
President of the
Nat. Dental Assoc.** The Organization Committee, of which I am a member and have been from the start, has traveled all who lent their assistance to the furtherance of time and money, and worked hard. I am glad that their labors have been approved, and I congratulate every one connected with the Congress upon its success.

**Dr. H. F. Peck,
Secretary of the
Nat. Dental Assoc.** So far as I am concerned, I am very grateful to all who lent their assistance to the furtherance of this great work which they have undertaken and carried out to a successful issue. Different individuals with different temperaments and characteristics worked along different lines, and I am sure no member of this great and grand profession has had for one moment any thought except the best interests of this Congress. It has turned out that everything that has been done or attempted has worked out to the success of the Fourth International Dental Congress.

As chairman of the Programme Committee, I have had very little work comparatively to do. I tried to do the best I could, and in that connection our Secretary-General is deserving of more credit than I am, as he has done a greater portion of the work.

Dr. J. W. Crawford presented a report of the Committee on Resolutions, an abstract of which follows:

Whereas, the success of the Fourth International Dental Congress has been largely due to the efforts of Drs. H. J. Burkhart, president; E. C. Kirk, secretary-general; M. F. Finley, treasurer, and the other general officers, especially the chairman of the Finance Committee, Dr. C. S. Butler, and also Dr. J. A. Libbey, and

Whereas, the rulings of our presiding officer have been eminently fair and satisfactory, we take this opportunity of expressing our appreciation of the same,

Be it Resolved, That much of the enjoyment and high entertainment, social, moral and professional, is attributed to the local committees in the city of St. Louis, especially Drs. Conrad, Thorpe, Fuller, Bowman and LeCron, we desire especially to express our gratitude and appreciation to them.

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Also we desire to express our thanks to the following:

To the officers of the Louisiana Purchase Exposition, under the management of Mr. Francis and his assistant, Mr. Howard J. Rogers, for their assistance in carrying this Congress to a successful issue.

To the Federation Dentaire Internationale, and dentists from foreign countries, who by their great information on the subject of international dental subjects and counsel have aided us.

To the Registration Bureau in general, under the able management of Mr. R. I. Pearson, in connection with the *Dental Cosmos*.

To the Dental College for the use of the chairs for the clinics.

To the members of the Clinic Committee, and to all those who have by material support and sympathy given encouragement in any form to the development of the now completed work of the Congress.

To the nurses at the hospital who prepared everything for the surgical operations performed.

To the manager of the Jefferson Hotel, in rendering the banquets at his hotel such a success.

To the gentlemen who had charge of the magazine which furnished us with a copy of the daily transactions.

To the chairman of the Exhibit Committee.

To Dr. B. Holly Smith for his efficient services as chairman of the General Reception Committee.

To the Commissioners of the Missouri State Building for the courtesy of loaning their building for the reception.

To Dr. Godon for his beautiful exposition of instruments.

Resolved, that the Organization Committee be instructed to prepare and present to Dr. H. J. Burkhart, president of the Congress, a suitable and substantial testimonial in recognition of his untiring and most efficient services in bringing together in such a business like manner the results so satisfactory in every direction.

Dr. Thompson then took the chair.

Dr. Crawford moved the adoption of these final resolutions.

There is an aspect of this Congress which we have all appreciated and realize, and yet I question whether those who have appreciated the point about which I am to speak are in a position to know just how it came about. I refer to the international character of this gathering, the spirit of international comity which has developed here; and I wish to emphasize the fact that from the first beginning of the matter, when an appeal was made to the countries of Europe to take an interest in promoting the organization of this work, that the response in every direction was enthusiastic and no one so well as myself can understand the enthusiasm, the untir-



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ing labor, the earnestness of the chairman and members of the European committees of Publicity and Propaganda. They have helped to a consummation of the result which not only is measured by numbers, but by the quality of the work, but by another feature, the solidarity of the dental profession throughout the world.

These men have contributed in a larger degree than any other to the success of this Congress, and I ask that this report be further supplemented, that these committees be included in our vote of thanks.

The report was adopted by a rising vote.

Dr. Burkhart then resumed the chair.

President Burkhart.

I know you are all glad to have Dr. Corydon Palmer with us, and to have him say a few words to us.

Dr. Corydon Palmer.

I hardly know how to express my feeling. I am too full. I can only say that I am of the past. I began the way in 1839, and have devoted my long life, beginning with the early pioneers, and being with their advancement in our loved profession up to the present time. I am in my 85th year, and in the possession of all my faculties, and feel the same interest I always have felt in professional advances. Since I have been here, I have been honored on every hand, and I feel grateful for the attention shown me. I hope the younger members who have come into the profession since my early efforts, may be blessed with success, and that you may live and be prosperous and happy. You have my sincere thanks for the kindness you have shown me.

**Dr. J. H. Magee,
Pittsburgh, Pa.**

Some of the gentlemen said they were not prepared to make a speech. I am. I have been preparing for this occasion for two years. Two years ago, I was placed in the position of being responsible for the appointment of the Organization Committee for this Congress. If I never did anything else in the profession, I am going to congratulate myself for them. I have followed the work of this Organization Committee from its inception. I have attended their meetings, except two, and never in all my experience in working with the dental profession have I seen such thorough work done and in such harmony. What is the use of saying anything more? I congratulate each and every one for the success of this work. I have heard some complimented for having the burden of this work on their shoulders; but that is not my experience. I know of no one man on that committee who worked harder than the others. Every one did his work thoroughly. Some of the work showed more than others, but every man worked and devoted his time, and you have seen the magnificent result.

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I was appointed as chairman of the Committee
Dr. C. H. Libbey. on Conference with State and Local Societies.

That meant the general information bureau for the different committees. That meant collecting the memberships, soliciting donations from the State and Local Societies. I never in all my life had anything to do with a body of nearly fifty men who worked in such harmony and made my work as chairman so easy. I want to thank each one of that committee personally, and I want to say here that the suggestions of that committee is that we organize, that we keep that as a permanent organization for the purpose, that if any international question comes up and any member of the profession wants to know anything about any State, territory or possession, there is a man who has thoroughly canvassed that territory or State or possession and can find the information for him.

I hope five years from now when we go over to the next Congress, that we will have even a greater meeting than this one.

Dr. C. S. Butler made a short address of thanks, as did Dr. David, of Texas.

I wish to express my thanks to the officers and
Dr. Conrad. to those present for the meeting. I am thoroughly satisfied at the successful ending and exceedingly thankful. It has cost me many worried days and sleepless nights, but I am glad the outcome is successful.

I wish to thank the Organization Committee for their many courtesies, and especially do I thank the local reception committee of the State of Missouri for their co-operation and hearty support.

I also wish to thank the members of the General Reception Committee and its chairman, Dr. Holly Smith, for their hearty support in giving the beautiful entertainment at the Missouri State Building.

I wish to mention that this opportunity your President has given me is a very pleasant moment to me and I appreciate it.

Drs. Thorpe, Finley and Harlan, also voiced their thanks for the co-operation given them in their efforts.

Drs. Godon, Aguilar, Zigmondy, Jenkins, Guerini and Bryan, each made a speech of thanks and gratification at the outcome of the Congress.

Every one directly or remotely connected with
Dr. E. C. Kirk. this movement has been thanked and re-thanked. He has been thanked on the American side and on the European side, and we are really loaded down with thanks. To all these expressions, I wish to add my hearty indorsement. To me, the result which is now being brought to an end produces a feeling of profound





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thankfulness and gratitude, towards every one who has been concerned in this great uplifting movement for the profession which we represent.

It remains for me to thank you most profoundly
President Burkhart. for the honor which has come to me as your presiding officer, and for the uniform courtesy which I have received at your hands. I may also say that while I have presided over a number of bodies before, I never had the distinction of presiding over one that was more obedient to the rulings of the chair. I feel grateful to you for your many manifestations of friendship.

To our distinguished guests, I desire to extend our most hearty thanks for their presence, and for the prominent places they have occupied in the work of this Congress.

I desire also to thank the profession in St. Louis for their assistance to the Organizing Committee, and to all of you who have come here and manifested your interest in this great Congress, and have contributed so much towards its success, I say thank you, from the bottom of my heart.

It only remains for me to say good-bye, and good wishes to all of you; and to declare this Congress now adjourned, to meet in Berlin, Germany, in 1909, as the guests of the National Dental Society of Germany—to be called the Fifth International Dental Congress.



Section VII. Operative Dentistry.

Dr. C. N. Johnson, chairman, invited Dr. Charles Godon, of Paris, France, who was present in the audience, to occupy a seat on the platform, saying that it was an honor to the Section that Dr. Godon should select it out of all the others by being present at its opening session.

A paper by Dr. E. A. Bogue was read by the Secretary.

Discussion on Dr. Bogue's Paper.

Dr. Charles H. Worboys, of Albion, Mich., recommended that young children before the eruption of the second teeth, should use them under considerable stress. His own children are made to eat nuts, and to crack them with their teeth—his idea being that the great stress thus brought to bear will have an energizing effect upon the germs of the second teeth, which at this period are depositing tooth bone.

To crack the shells of nuts with the teeth I think
Dr. John T. Hart, is not good practice. I think that if the teeth are used
New York. sufficiently, we get first proper salivation, and finally
we invite sufficient blood to the parts, ultimately secur-

ing healthy periodontal membranes. In bringing such hard substances as Dr. Worboys has suggested in contact with the teeth, and the crushing of those hard substances, we are bound either to fracture portions of the enamel, ultimately inducing decay; or if, referring to his suggestion of using these materials with the temporary teeth, when the roots are partially absorbed, there is great danger, to my mind, of forcing those teeth out of their sockets and losing them before their proper time.

I do not take any stock in what Dr. Hart said,
Dr. Worboys. and I will tell you why: no baby or little one will use
any more force than is necessary to crack
a nut; and if the child has not the muscle, it cannot crack
the nut. Any tooth that is sound and healthy will stand
anything that the muscles of the jaw will stand. If those
muscles are strong enough to bring the jaws together to crack the nut, I
will warrant you the jaw will stand it. If the tooth has been decayed and
is filled, of course it is not wise to use it, because the tooth is weak; but
as an exercise for those baby teeth for the development of the permanent
teeth, it strengthens the muscles and puts us in the habit of grinding our
food instead of bolting it. If our food necessitates grinding, you will use
the muscles, and habit is a great thing. You cannot develop a football
player by putting him on the benches. You make his muscles by having
him use them. If you do not use your teeth, they will be pretty poor stuff.



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Dr. Ottolengui. I would like Dr. Worboys to reply to Dr. Hart's criticism, where he spoke of the teeth during the absorption of the temporary roots. Whatever might be true of the teeth while they are sound, would not necessarily hold when the teeth begin to lose stability by the loss of their root ends.

Dr. Worboys. I will say that when that tooth begins to get weak in its support, you cannot get the little one to use it. The child will not come down hard on it—any more than any of us would try to lift anything heavy with an arm that is rheumatic, if the muscles are weak. You cannot overdo it. I do not think it is possible to get a child to use a tooth when the roots have begun to absorb to such an extent that they are a little loose. Any time you think so, see a patient with a loose tooth from pyorrhea. See how much he will come down on it. He is looking for a soft piece of milk toast to bite on.

So far as putting the other teeth out of line when the roots have begun to absorb, I do not think that is possible.

Dr. John T. Hart. The gentleman has made the comparison of physiological resorption and the pathological condition we find surrounding a tooth suffering from pyorrhea. Where the roots of temporary teeth are absorbing, it is a purely physiological process, and we do not find that condition of bruise—if I may term it so—that we find surrounding a tooth suffering from pyorrhea. It has been my experience that children having teeth with roots that have resorbed fully two-thirds of their extent, are not aware that any process is going on in the teeth to make them at all uncomfortable. As far as the use of teeth affecting the circulation in the enamel is concerned, my knowledge has been increased by the statement made by Dr. Worboys. I was not aware that the use or abuse of the enamel organ would stimulate the circulation in the enamel.

Dr. Worboys. I take exception to that. I never said—or if I said it I made a mistake—that there is any circulation of blood in the enamel. I meant there is a stimulation of blood to the part.

Dr. Riggle. When these temporary roots are absorbing, there are other teeth coming into place to take the stress of the jaw. You cannot have good teeth unless you use them, and that is the way to keep them clean, too—to use them.

Dr. E. K. Wedelstaedt, of Minneapolis, Minn., then read a paper on the subject of "Gold and Tin." The following is an abstract.

Gold and Tin, by Dr. E. K. Wedelstaedt.

For seven years prior to 1891 the gingival third of practically every cavity in the proximal surface, which I had filled with gold, contained some tin or gold and tin in combination.

For the past ten years so many of my patients have been returning with cavities of decay, around the gingival margin, which it was supposed was protected by the tin, or by the gold and tin in combination, that I felt much trouble might be saved others if attention were called to this subject.

There is absolutely no virtue in tin or in gold and tin in combination in so far as this relates to the preservation of the human teeth. On the contrary, there is no filling material that has done so much harm and been the direct cause of destroying the life of the pulp and destroying the dentin, in proportion to its use, as tin, or gold and tin in combination.

Where the gingival portion of a cavity in the proximal surface is filled with tin and the operation completed with gold, what results? 1. We have a movement in the tin. The tin moves towards the gold and away from the cavo-surface angle of the cavity. 2. With this movement in the tin we have an opening between it and the cavo-surface angle. The moisture enters between the cavo-surface angle and the tin, and an oxidation of the tin takes place. 3. With the oxidation of the tin we have an infiltration of stannic acid into the tissue of the tooth which surround it. 4. If this condition is left to itself it is but a question of time before the oxidation penetrates to such an extent as to impair the vitality of the tooth. The dentinal fibrils are destroyed, this is followed by the death of the pulp, and the tooth is on this account degenerated; it is then in a fit condition to invite caries. In fact, the moment there is the slightest movement in the tin, causing it to draw away from the cavo-surface angle, small particles of food and micro-organisms occupy the space between the filling material and the cavo-surface angle. The greater the movement of the tin, the larger is the ditch which exists along the gingival margin. We all know that wherever there are ditches of this kind we have a condition which invites caries. In my studies of these conditions where tin, or gold and tin in combination, have been used, I have seen all classes and kinds of caries around the gingival margins and in the cavity itself.

**Tin and Gold
in Combination.**

If this much can be said of the results which follow the use of tin in combination with gold, what can be said of the results which follow the use of gold and tin in combination? All writers who have advanced the use of gold and tin in combination agree on one point, which



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It is asserted is in its favor, and that is, its remarkable change of character. In other words, when we first place mats or cylinders of gold and tin into cavities they are very soft. Later on there is a change in the materials; they become very hard. What is this change? It is purely and simply a crystallization. In the process of crystallization the molecules are drawn more closely together, and we have as a result a change of form as well as a change in the character of the material. Wherever there is a crystallization we know that there must be either an expansion or a contraction in the mass. All scientists recognize this as a fact, for it is one of the fundamental principles of chemistry. We know definitely that in the crystallization of gold and tin we have exactly the same conditions existing around the gingival margin as where tin and gold are used. What are some of these conditions? We have an open ditch around the gingival margin, absorption of the gum in the interproximal space, destruction of that portion of the periodontal membrane which is adjacent to that tin or gold and tin in combination, a condition which invites disease, a faulty environment, which if left to itself will naturally lead to the destruction of the tooth, etc. Materials which bring about such results are not to be considered as aids to the preservation, much less to the salvation, of the human teeth.

Discussion on Dr. Wedelstaedt's Paper.

**Dr. Ambler,
Cleveland.**

As long as the essayist has seen fit to criticise the use of tin as a filling material at the base of the cavity, it seems to me it would be fair to consider for a moment the properties of tin, where it is used entirely for filling a cavity. We know that tin foil has been used in the United States for about one hundred years. One of our distinguished operators said a few years ago—and he was at that time a man over seventy years of age—that if all other filling materials were blotted out of existence, and only tin foil remained, more teeth would be saved than ever had been.

It has been clinically demonstrated in most cases where the tin was removed and the filling replaced, perhaps with gold or refilled with tin (I am speaking now of cases where the tin filling did not leak) that the dentine of the tooth had solidified, and one of our microscopists who had observed that fact many times termed that "progressive calcification." When placed in a tooth of doubtful character, the tooth substance calcified and became harder than when the tin filling was placed there. I can show you specimens of that kind that were in the mouth for years. I know many years ago tin was recommended by a number of operators. Dr. Chase, of St. Louis, was one of the prominent members of the profession

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who recommended it. With the appliances at that time—all hand instruments—and no special method of obtunding the sensitive dentine, he said he excavated the cavities as well as he could and then filled with tin. His was not the only testimony that those cavities had lost their sensitiveness so they could be prepared.

That is rather different testimony from what we had given us in the essay. I have been using tin foil for filling teeth for over thirty years. When I first commenced, I did not think of making a record of my cases. In those times we did not keep as many record books as now. In 1882 I commenced keeping a record of cases filled with tin, and also those where the gingival third or half of the cavity was filled with tin. I am speaking on the supposition that the essayist used cohesive gold. He did not say it, but I think he is a cohesive gold worker.

Dr. Wedelstaedt.

Yes, that is right.

Dr. Ambler. In 1882 I filled the buccal surfaces (and I know others have done the same thing) of the left second molar, pulp alive, cavity covering about two-thirds of the surface. I filled that cavity about one-third, beginning at the gingival portion up to and covering over to where the pulp had been exposed. Then I commenced with cohesive gold and finished the filling. Two weeks ago, I saw that very patient, and there is no decay around the gold or the tin.

In 1889 I filled some approximal cavities for one patient in bicuspid and molars. About ten days ago I examined them, and there is no sign of decay there. If there is any danger of a pulp dying under tin, why not seal the thin portion or palatal wall with some of our varnishes, if you are afraid it will die? That is no objection to tin, any more than it is with gold.

Gold is four times as good a conductor of heat and six times as good a conductor of thermal changes as tin.

The essayist says he used tin at the cervical border. It may be possible that good tin foil has not been used. I do not know what kind the gentleman used, nor his method of using it. I think from what I know of the matter, that either the tin foil was poor material, or else the method of manipulation was faulty. I know his method of manipulation with gold is complete; but it must have been one of three things—poor tin, faulty manipulation or the cavity not thoroughly excavated. I think it was a poor tin foil. I can demonstrate to you that a great deal of the tin foil is not fit to put in a tooth.

The facts, as I look at them, are these: After the tin is put in at the cervical margin, and the rest filled with cohesive gold, galvanic action takes place between the tin and gold. The tin is the positive element and the gold is the negative, and after the tin filling is coated, after it turns



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black, the galvanic action stops. In a good many instances, I find this oxidation penetrates into the dental tubuli. What if it does? It helps to close up the tubuli, and is a barrier to further progress of decay.

I had not thought of discussing the subject at all.

**Dr. Clark,
Towa.**

A better and an abler man was to have taken the burden. Understand me in anything I may say as having only the kindest of motives. I was taught to use tin foil, and a combination of tin and gold, in 1876-1878—between those times. Undoubtedly owing to the imperfect manner in which I used it, I am obliged to tell you today that every filling I know of has failed. Have it understood that I was a young man, and also that a great many fillings I made at that time with cohesive gold and amalgam have since then failed, too; so it is not conclusive that it was the fault of the tin. The oxidation of tin or of any material preserving the tooth structure has always seemed to me a queer proposition. It seems to me as if it were an argument that it was necessary to go ahead and partially destroy, in order to bring out the best qualities. I know that it has been the custom to use nitrate of silver for the prevention of decay. If you could have been in Dr. Wedelstaedt's office last winter, and have seen a set of teeth that had been treated by an advocate of nitrate of silver for the prevention of caries of the human teeth, I do not believe you would ever be guilty of using it again. It did undoubtedly prevent decay for the time being; but the after effects of that case were a great deal worse than the first condition. I am unable through a lack of knowledge of chemistry, to give you just the conditions, and the why and wherefore; I can only give you the practical facts in that case, and I will ask Dr. Wedelstaedt in his closing remarks to give you the scientific reasons for the failure of those teeth under the nitrate of silver. The claim is made that the oxidation of tin preserves the teeth. That those fillings have failed where cohesive gold has been used in the gingival third of cavities in the approximal surfaces of bicuspid and molars, is not to be wondered at. Very few men are alive today who can make absolutely perfect adaptation of annealed gold to gingival margins of such cavities. In the place of that, I would use the unannealed gold, because I believe it is as easy of adaptation as the tin foil, and I believe that it lasts longer. I believe it is just as easily trimmed.

I have not been in practice as long as the Doctor, nor so close an observer; but I can show you a patient in this city now, who has nearly every approximal surface of the bicuspid and molars filled with gold in which unannealed gold was used in the gingival third. If you can find recurrence of decay along those margins, if you can find overhang there, I will treat you to the best supper you want.

The Doctor tells us of gold that has failed. He tells us also of the

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fillings made of the combination of gold and tin, that are in perfect condition today. I believe there is such a thing as immunity. I have cavities of decay in my central incisors that were there twenty-seven years ago, and I cannot see by the closest examination that they have progressed a particle. I have seen a patient in Dr. Wedelstaedt's office who has all of the upper central incisors decayed, and there is a total arrest of that decay. The patient is absolutely immune to the ravages of decay, and the cavities are unfilled. If those teeth had been filled at the time of the great susceptibility to decay that existed when that decay first took place, unless they had been filled by a Black or a Searles, or some such operator, it is very liable that recurrence of decay may have taken place; but I believe today in the condition of immunity that exists there, almost any man might make the fillings with any material he wishes, and there will be no recurrence.

Dr. Ambler is a man who has been confined indoors a great deal, and a man whom I would think was susceptible to decay, from the number of cavities he speaks of in his teeth; and no doubt many of those fillings had overhang. I have seen fillings in my own office, in the mouth of a patient from the state Dr. Amber hails from, who had overhang on every filling in her mouth, and nearly every approximal surface of her teeth had a filling in. They were gold, amalgam and cement, and those same teeth have contact points; but those contact points were at the gingivæ. This patient could not eat without a tooth pick; she said sometimes she wished she had one in either hand. The man who made those failures made fillings in the root canals of the upper first and second right molars for that lady, of cotton. I have a letter from him, in answer to one I wrote asking him to give me the previous history of the teeth, in which he says he made them with cotton saturated with carbolic acid and iodoform. When I removed them, I believed that he had used those things. It is that kind of work that is responsible for the recurrence of decay about a great many gold fillings in which I have no doubt the condensation was perfect.

In 1878 I was hunting near Clear Lake, Ohio, with an old soldier named McLaughlin. He used to always have his mouth full of fine bird-shot. He had a cavity of decay and had spoken a number of times of having it filled. One day he came up to the office, and said: "I was going to have you make a filling in that tooth, but I have one in there." I found it to be one of the little bird-shot. I extracted that molar for him in April, with that bird-shot still in the cavity, just as perfect as any filling I could have made for him.

You will notice Dr. Ambler speaks of those cavities as having been filled in the last twelve years. I believe at that time he had arrived at the period of immunity, and I believe a gold filling properly placed there would undoubtedly have been there today. The cavities he speaks of





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failing from the wear or stress of occlusion, and splitting away, I do not wonder at. There is a section in the Western part of this country in which we do not believe in using pits or parallel grooves in the lingual or buccal surfaces for retention. We believe that not only gold, but any other filling would fail under that, whenever stress of mastication had worn those down until the little walls in the enamel became subject to that stress.

Dr. Geo. A. Poundstone, of Chicago, read a paper entitled "The Cement Problem in Inlay Work." The following is a part of the discussion:

Dr. E. C. Darby,
Philadelphia.

Cement is generally regarded as the weak point in porcelain work. It has been truthfully said that no chain is stronger than its weakest link, and they say that no inlay is stronger than the cement with which it is set; but I believe almost any of the good cements is sufficient to hold a properly constructed inlay in its place—barring all accidents—for from five to ten years. I make that statement guardedly, and you will notice that I premise it by saying a "properly constructed inlay." I think the failures we often attribute to cement are not always the fault of the cement, but of the shape of the inlay.

Dr. Jenkins brought out a valuable point when he spoke of the mixing of the cement. Many a man mixes cement for an inlay as carelessly as he mixes it for a filling. I believe it should be mixed with as much care as the most particular, painstaking artist mixes his colors for the finest piece of porcelain work he is going to paint. You cannot take the solution of phosphoric acid and the powders of which our cements are composed, mix them carelessly on a slab, and expect to get good results. A little of the powder should be worked into the liquid at a time, and it should be thoroughly spatulated. Most of these cements do not set so quickly that an expert operator cannot thoroughly incorporate the powder with the liquid, and not have it set in his hands. If he has his cavity dry, and everything right at hand, if he knows just where the inlay is—not mixed up with his instruments—he can mix the cement for a considerable period of time, thoroughly incorporating the powder with the liquid.

We must not condemn the cement because of our failures. I think I speak the truth when I say that very few inlays that are properly constructed and properly cemented in, fail because of the possibility of the solubility of that cement in the fluids of the mouth. When you take out an inlay you do not often find a wasting away of the cement on the margins. You will find the cavity has been well lined. Therefore the cases

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of recurrence of caries under inlays, where the cement has been properly introduced, are comparatively few and far between.

I think we are at a period when there will be as great an improvement in the character of our cements as there has been in our alloys and in our porcelain. I hope that by next year, with all the skill and painstaking efforts that are being employed, we shall have a cement that shall be as good as our porcelain—and that will certainly be good enough.

It has been asked what was the color of the cements used. In every case where it was possible, I used the light yellow cement. There is a decided difference in the colors of the cements from the different manufacturers; that is, there is evidently some material used for coloring matter in the different cements that has a great influence upon that cement. For example, I have found that the bubble was far greater in a bluish cast or in a pearl gray cement than in a yellowish mass. It was also greater in a pure white cement, and the least bubble has been found to be in the light yellow cements, which appear to be without coloring matter whatever.

As I said in my paper, in my opinion these inlays are locked into the cavity by the cement acting as a key; that is, the cement in many cases, I believe, will hold the inlay in position for months and years. Even though that cement is not sticking either to the cavity or to the inlay, if the cavity is properly prepared, there should be retention enough in the cavity to hold the inlay in any position excepting one, and that would be in the position that would be least liable to have the inlay withdrawn or dislodged. It is not absolutely necessary that the cement adhere perfectly to the sides of the inlay and the cavity. I think that is the case many times, that they are simply held there by the proper retention of the cavity. The solubility of the cement is not so much at fault.

There were but very few measurements in which the largest grindings were larger than 1-100 of an inch; if they could be ground finer, I think it would be wise to do it.

The following is an abstract of paper read by Dr. Sylvester Moyer, of Galt, Ontario, entitled, "Ten Years Progression in Cavity Preparation. With Special Reference to the Enamel."





Cavity Preparation, by Dr. Sylvester Moyer.

Environments differ about different teeth and different dentures. How do present conditions compare with the condition of teeth that were at the World's Columbian Dental Congress? They are worse—the environments are worse. There is an increased tendency to caries of the teeth. Dentistry, however, is better; bridgework and porcelain work are better, but the greatest and most important advance in this decade has been in cavity preparation. For ten years the searchlight of modern investigation has been thrown on the enamel, and during the same time cutting, chiseling and dovetailing has been improved, until we are now approaching the ideal.

Dr. Black and Dr. Williams taught us that certain teeth are immune to decay, that this is in a measure due to cleanliness, and that such cleanliness is caused principally by friction.

There is extension for prevention as well as for retention now. We consider the enamel rods, their direction, the histological species, and the nourishment. Cavity preparation is today the most important condition that confronts us. This is equally true of inlays, plastic fillings or metal fillings. Until some way of massage or medication shall be devised that shall prevent the gelatine-producing micro-organisms from having their habitat in the mouth, our only resource will be to fill the cavities as conscientiously and as thoroughly as we can.

We will, if we live long enough, all prepare cavities with definite steps and angles, and gradually but surely more and more apply the principles of extension for prevention. All of these considerations, however, may be observed, and yet the filling be short-lived. The enamel rods must be considered; if they are not, the filling, whether of gold or amalgam, will be apt to leak in a short time. Unless we leave the enamel rods supported by healthy dentine, the filling will either break away through stress of mastication or the rods will crumble from their support and fall out.

Ten years ago we referred to teeth as being hard or soft. We now speak of their environmental conditions. All enamel rods should be supported by sound dentine. The enamel walls must be cut back so that the stress of mastication will not bear too heavily upon them. Enamel that is kept clean will not decay.

The success of fillings, whether inlays or plastic or metal fillings, depends to a large extent upon the enamel and cavity preparation.

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Discussion on Dr. Moyer's Paper.

The important points in deciding the proper treatment for a decayed tooth and the preparation of a cavity are:

Dr. H. E. Webster,
Toronto, Can.

1. A consideration of the general condition of the oral cavity. 2. The force to be applied in ordinary mastication to that tooth, after the filling is placed. 3. The possibility of the application of the filling.

These three things, I think, should fairly well decide as to the placing of the enamel margin and the treatment of the enamel margin. Those very considerations were beautifully illustrated this morning in the clinics. Every operator judged the condition of the mouth as to the location of his enamel margin, and he judged also the force to be applied upon the enamel margin. In one instance I heard the criticism made that the enamel margin was not quite in the right location; but immediate answer came: "There is no occluding tooth." That had all been thought of before.

There is always a difficulty in applying a metallic filling such as a gold filling to frail enamel margins. Many frail margins before the filling is put in are destroyed by the application of the gold to the margins. Usually the margins are not as firmly supported by the enamel rods as they should be.

I might say a word of compliment to the gentlemen who do not rise to discuss the paper. I take it that they are all reading men. They keep up with the literature of the times, and I hope everyone has

Dr. E. C. Darby,
Philadelphia, Pa.

read Dr. Johnson's book on the subject of cavity preparation and filling. The dental profession today, I think, is awake to the importance of properly preparing cavities before introducing gold, and the gentleman who has read the paper has only emphasized again the importance of thorough preparation of the cavities in connection with the filling of teeth.

I do not believe that intelligent men—and I take it that men who come to this Congress are intelligent—fail to understand what is the more recent method in regard to the preparation of cavities. There is a difference of opinion as to the extent of cutting that should be done—an honest difference of opinion; but I think all men understand that they cannot prepare cavities as they did in former times and get as good results as they can get by preparing them as do the reasonable men of today.

We had an object lesson today in the clinics given on the prepara-



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tion of cavities. I saw some before they were prepared, others after they were prepared, and others after they were filled; and no greater compliment could be paid to the clinicians than to say their operations were as fine as could be found anywhere in the civilized world.

There were operations there this morning that any dentist of America, or of Europe, or of any place in the world might justly be proud of.

Dr. Johnson, chairman of the Section, then introduced Dr. Corydon Palmer, of Warren, Ohio, one of the oldest practitioners of dentistry in the country. Dr. Johnson said: "There is no man in the profession with whom I am familiar who has done more to build up operative dentistry by virtue of his native ability and his close application to those principles which have gone to make American dentistry what it is today than Dr. Corydon Palmer, the gentleman who now stands before you."

I am glad to know that the rugged old soil of Canada was not so exhausted by the raising of a Johnson and a Thornton but that it could give us other men whose names will become familiar to the dentists of today. I can add nothing to the paper that has been read. It seems to me any man who begins the study of dentistry, and carries it to the point that the two gentlemen from Canada who have already spoken in your hearing have gone, can never go back. I believe they will never be content to plod on in the old way. I hope, as years go on, that I may be able to see fillings I have made in the last few years stand at those margins; but I believe it is better to err on the side of safety. I think the cautious operator—not the timid operator—cares for those enamel margins and protects them from stress so they will carry the load that is expected of them.

I wish to add my commendation to the clinic given this morning. It is the finest work I have ever seen. The cavity preparations were after my own heart. I did not have any idea in my paper that I had anything new; but I wish to emphasize and repeat the great importance of carefully considering these enamel margins. There is a great tendency to be a little careless, and if you would ask me if I always prepared cavities just like that, I would have to confess that I did not; but the nearer I do it on those lines, the more my conscience would pat me on the back, and the better my work would stand.

The following is an abstract of paper of Dr. Frank L. Platt, of San Francisco, Cal., entitled "Success and Failure in Operative Dentistry."

Success and Failure, by Dr. Frank E. Platt.

Operative dentistry may be defined as embracing all that portion of dental science not concerned in the replacement of lost natural teeth, or the correction of their irregularities. For the purposes of this paper, the subject will be confined to the ordinary and most frequently performed operations of dental surgery.

To properly define failure in any undertaking, it becomes necessary to decide what constitutes success, and where this has been defined, failure becomes the antithesis.

The teeth under normal conditions, as evidenced in animals and savages leading a natural life, were intended to perform their various functions throughout the life of their possessor; but as we are considering the teeth of civilized man, allowances must be made for the degeneracies of habits and customs of our life. Few individuals reach the age of maturity, and fewer still reach middle age without suffering the loss of one or more teeth, and without having had recourse to operative dentistry.

It is impossible for the human race to revert again to savagery or to return at once to those conditions. We may remove the local and exciting causes, but as we cannot change or modify the diathesis which is the predisposing factor in each instance, it is logical to assume that the cause which led to the disease may cause its recurrence. While it is possible that the predisposing cause may be overcome by a continuous course of prophylactic treatment, it is not safe to say that it will last.

There is always the predisposing personal diathesis and the age and temperament of the individual, and the circumstances governing the case.

A successful dental operation may be defined as one which under any conditions is productive of the most nearly ideal results in every individual case.

Much has been written on the bacterial origin of caries, but there is another point from which the failure of operations may be reviewed, and which reveals a state of affairs as deplorable as it is unnecessary.

Every profession, trade or general occupation is governed more or less by precedent, but there is no reason why the dental profession should adhere as tenaciously as it does to the unfortunate application of the rules of trade, to a profession which should never have known their influence.

The subject of value should be in accordance with the skill exercised.

When many men of many minds are interested in anything, there will be a diversity of opinion, of course; yet it is reasonable to expect fairly uniform results in the practice of dental surgery; but we are led to believe that something is lacking in operative dentistry when a large part of the



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time of a practitioner is taken up in remedying the defects of work previously performed by himself or other operators.

We may find in a specified case a few fillings of gold or amalgam. "Old Dr. A. filled that tooth fifteen years ago, and I guess it is all right yet," says the patient, and an examination shows it to be so.

We find that some of the old fillings made were well condensed and well finished, although they may not be up to the present ideas of extension for prevention. We find, too, overhanging edges and carious margins in other instances. We may also find an ill-fitting crown brazenly proclaiming its presence on an incisor tooth. Inquiry will reveal the fact that the teeth were not cleaned for months or years, although many operators had been consulted.

The patient will be found to be almost ignorant of the methods and materials to be employed in the proper daily care of the teeth, and an intelligent idea of the value of the work performed.

All this does not bear out the idea of the wonderful progress made by dentistry.

It is not the lack of zeal nor the lack of understanding always that leads to failure; but a lack of sufficient will power to overcome the evil precedents engendered by an unholy thirst on the part of the public for something cheap, and an equally unholy readiness on the part of the profession to give it.

We should educate the public to an intelligent appreciation of the actual value of skilled services, and the part they must take in the care of their teeth; and our colleges, journals and societies should teach that integrity and success walk hand in hand, while falsehood and deceit are bound to failure by inseparable ties.

Discussion on Dr. Platt's Paper.

The gentleman who was for a few moments introduced by our chairman—Dr. Corydon Palmer—
Dr. C. S. Stockton, recalled to my mind some fillings I saw put in by that
New Jersey. gentleman many years ago—simply lining the enamel with gold and the rest of the filling with tin. A gentleman spoke here a few minutes ago in regard to the preparation of enamel surfaces—that in a few months, or a short time comparatively, dark lines would show. It was some thirty years after those fillings by Dr. Palmer were made when I saw them, and not a dark line was about any of them. (Applause.) If the patient had lived thirty years longer, I think those fillings would have remained the same. Soft foil was put against the enamel, and I have sometimes thought if I were called upon today to decide whether soft

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foil should be abolished or cohesive foil, and we should be called upon to depend entirely upon one or the other of those materials, that soft foil would stay, if decided by my vote!

Excuse my mentioning a personal case that I saw only this spring. A patient came in, and, after doing some work, I said to her: "How long is it since I put those fillings in for you?" There were fourteen fillings in her front upper teeth. She thought a moment and said: "Doctor, it was thirty-one years ago." Having a personal feeling about it, if I had that patient here today and you gentlemen were to pass upon the question of whether Stockton should have salvation or not, I would be willing to present the fillings before you.

We do not get enough for our services, I think, sometimes. There are few callings in life that are so trying and exhaustive, and comparatively few of us, when we get to be as gray-haired as I am, have that accumulation that the work we render to our friends and humanity entitle us to enjoy.

Another personal instance let me give you, showing perhaps that we must have a little discretion in regard to the kind of fillings we put in. A lady went to Cleveland a number of years ago. I had done work for her from the time she was a little girl. She married and went away. One of her front teeth decayed, and gave way. A dentist there put in a very beautiful porcelain filling. It remained in only two weeks. She said: "I must go back to New Jersey. Dr. Stockton is the only man who can fill teeth for me." If he had used gold, possibly it would have stayed. I am a great admirer of porcelain work. I do some of it, but not exclusively. I am proud of my calling, and glad I have been a dentist and been able to help humanity.

**Dr. Whitney,
Honolulu.**

For many years Dr. Stockton and I were in the same class together. Though we sat side by side, I did not recognize him, and doubtless he did not know me. It has been over thirty-five years since we separated. I started out after my college course, fully impressed with the great value of gold. Very soon after graduating, I went to Honolulu. There I found a people who had, under the care of a very conscientious man, been taught to greatly appreciate the value of their own teeth. As he had left the practice, I continued his labors. There was no question asked at that time about what material should be used, its value or its cost; but I was asked to do everything that I knew how to preserve their natural teeth. Very few people have had such opportunities as I had, for a young man starting out under such favorable circumstances.

I was under the training of that eminent man whom you all know—Dr. James Truman, and was very intimate with him, and was often taken



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to his house, where he gave us out of his time and his energy a clinic on gold, and thus, though we were far from our present methods, I started out I thought with some knowledge of gold operation.

I feel I have been a blessing to my people in that country. For fifteen years I was the only dentist there. I knew every white person on those islands. I have been in practice over thirty-five years, and during that time I have not made one plate or artificial denture in a year. I have not during those thirty-five years made thirty-five sets of teeth. Why is it? Not because of my extra skill, but because I had a class of patients who value their teeth, and I had only to do my best for them.

Following Dr. Stockton, you will allow one personal remark: that hardly a day passes, as I keep my old patients, that I do not see gold fillings that I put in thirty-five, thirty and twenty-five years ago, as good today as when they were first put in.

I cannot say this of any other material. I have used amalgam, of course, in all its various manipulations. I have used cement and gutta-percha, and I have used porcelain inlays. We were taught in those early days to make inlays by cutting out from a selected tooth, the form of the cavity and inlaying it. I did something of that, but nothing in my hands is equal to gold, and so today my work and my thought is alone in gold operations.

I do not wish the paper to pass without complimenting it, and expressing my feeling of satisfaction for the information received from the two gentlemen who have spoken. I realize that success seldom depends upon the education of a man; but it is the heart he puts into the work. I have seen Dr. Platt's practice and his work, and I know every bit of success he has had is due to the fact that he puts his whole heart into the work.

Dr. H. G. Atwater,
Los Angeles, Cal. Some of the gentlemen seem to be in doubt about soft gold—hardly knowing which to discard, if hard or soft gold had to be abolished. It would not be hard for me to decide which one I would discard. We could always make soft gold if we had the other, but we could not make hard gold. While I use adhesive foil, I never start a filling with it. I always use soft foil in starting a filling.

Dr.
H. F. Merriman Jr.,
Oakland, Cal. I should not like this discussion to close without saying a word. Dr. Platt is a personal friend of mine, and the paper speaks for itself. After such men as Dr. Stockton, Dr. Whitney and the gentleman who has just spoken have paid such a high tribute to non-cohesive gold, I feel

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very much afraid to say that after twenty-five years' experience myself I gave a clinic this morning demonstrating the combination of gold with non-cohesive gold at the cervical wall. I believe I am satisfied that that is the best combination for a gold filling that will last.

Dr. G. C. Epling,
West Virginia. The gentleman from Arkansas said he started a filling with soft foil and finished with cohesive. I would like to ask if he extends the soft foil completely to the margin of the cavity.

Dr. Wyatt. I start from the side of the cavity.

The Chairman. Do you allow the non-cohesive gold to overlap the enamel margins?

Dr. Wyatt. Yes.

Dr. H. C. King,
Fremont, Neb. It seems to me the discussion is getting away from what I took to be the main point in the paper, and that is, that it is the care, the industry, the energy and the faithful work put into a filling that makes it

permanent.

The gentlemen gave instances of fillings put in twenty-five or thirty years ago, made with non-cohesive gold, and we were led to infer, if made with cohesive gold, they would not stand. I have seen fillings made thirty-one years ago, of cohesive gold, put in with the hand mallet, that stand as well as any I have ever seen. It was not cohesive gold that saved the tooth, but the care the gentlemen used in putting in the filling.

In regard to extension for prevention: If that is true, and it is the proper way to fill teeth, the gentlemen who filled teeth thirty years ago must necessarily have practiced extension for prevention; but until the time Dr. Black gave us that very happy term to describe it, it was known by other names. In the writings of Dr. Marshall W. Webb, he described the exact thing we mean by extension for prevention—that is, that the margins should be made so that the food should pass over and be self-cleansing margins. If you practice that, whether with soft gold or cohesive gold, or a good amalgam filling protected until it hardens and then polished, you will have a good filling that will last.

Dr. J. W. O'Reilly,
Fort Smith, Ark. After all the greatest secret of our success depends largely upon the preparation of the cavity. Some thirty years ago, I filled teeth with soft foil, hand pressure. Three of four years ago, I saw them and they were in good condition. I have been observing my failures, by which I have gained what little skill I have, and I feel the greatest secret of my success is in properly preparing the cavity and adapting the material to the cavity. I believe the greatest amount of failure is due to improper marginal preparation.





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Dr. E. N. Johnson,
Chicago.

We have heard from different gentlemen about fillings lasting so and so many years. We have heard of this and that method. Success in dentistry depends upon many factors. It is not the filling material alone, nor the method alone, but it is most of all the man himself. Let us take a certain operation—a filling in a cavity in a back tooth. Success depends not alone upon the preparation of the cavity. It depends on studying the conditions and reasons why that decay took place in the first instance. It depends upon the principles involved in the decay. I was pleased to find in Dr. Miller's paper that all of those things that seemed to be abstruse and scientific were practical when applied properly. It depends on the case in hand. Not only that one tooth, but all the teeth in that neighborhood, and the gums surrounding, and the saliva, and the constitutional diathesis all enter as factors into this question before we touch an instrument in the case.

Then it depends upon the preparation of the cavity, the placing of the filling material, whatever it is, and then upon the proper condensation of the material, the integrity of the mass, the proper finishing of the filling, and, more than anything else, the proper instruction to the patient to maintain that tooth in a hygienic condition afterwards. Success in dentistry means taking that patient's case into our own hands so far as we can influence him to recognize the conditions present, and let us change the conditions that brought about the disease in the first instance, and change the mouth from one of susceptibility to one of immunity.

It gives me the greatest satisfaction to hear this testimony from these old gray-haired men who have borne the brunt of the development of this profession of ours.

I want to know what other profession it is that gives to humanity the same advantage and practical benefit for the same compensation that does the profession of dentistry.

I may be pardoned for mentioning one case. I mentioned this in public before, but I am so proud of it that I mention it every time I get an opportunity. I had in my chair some years ago an old lady of more than eighty years. She pointed to a mesial filling of gold in a left upper lateral incisor. She said: "There is a history to that; that filling was placed there before I was twenty years of age." The filling had done service for that good old mother in Israel for more than sixty years. What an accomplishment that was! The dear old soul had even forgotten the name of the man who placed it there, but that made no difference to me. I metaphorically took off my hat and bowed my head to the man who did that work.

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There should be an enthusiastic endeavor to practice dentistry so as to give such results. I hope the younger members of the profession will take a lesson from the older men. I never fail to introduce an old practitioner to the young men at a meeting. I hope the young men will go into their work with the same enthusiasm and follow it out to the same success that these older men have had, and with our increased opportunities of today, with the widening out of the profession, we can accomplish something for dentistry and for humanity that shall leave a stamp upon the community that the profession of dentistry is something more than a mere trade.

Dr. J. A. Codd,
St. Louis. I want simply to confirm what I think in Dr. Johnson's speech is the whole keynote of the matter. My wife has seven fillings in her mouth, put in thirty-one years ago. Six are of cohesive gold and one amalgam, as black as coal, all in perfect condition, because she took care of them. Her age is fifty-one years, and every tooth in her mouth is perfect—not a single tooth missing, nor in any way affected. She has religiously taken care of her teeth, and if she lives to one hundred years she will have no trouble with them.

Dr. Stephens,
Hannibal, Mo. It is forty-five years this month since I commenced to study dentistry. I believe I bought one of the first books that Dr. Allport published, and I kept it. When I commenced, of course, there was no cohesive gold, and I would put in my soft gold; but I never could get the cavities filled as I wanted. Soft gold I used as a foundation for fillings. I used tin and amalgam, but I think it is proper to use something softer in starting a large cavity. A tooth is preserved as much by the brain as by the hand. It is the selection of the proper kind of material to fill it with. You can make a good filling of almost any material we have, if you properly prepare the cavity and manipulate it properly.

Dr. W. J. Taylor,
Sacramento, Cal. The motif of the paper I believe can be summed up on the one side by certain remarks, and on the other by certain remarks diametrically opposed. I think the success in operative dentistry can be summed up as follows:

1. In the proper preparation of the mouth and the oral tissues before operating upon any particular tooth.
2. The obtaining of proper separation before attempting the filling.
3. The proper preparation of the cavity for the introduction of such fillings as may be selected.
4. The proper introduction of the filling material selected.



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5. The proper occlusion of the filling after its insertion.
6. The best finish that it is possible to give any particular material which is used for a filling. I do not believe you can finish or polish any filling too much. We all know that the debris of the mouth will glide more easily over a smooth surface than a rough one.
7. Keeping the mouth in a hygienic condition with the introduction of the filling.

All these points to be successful must be backed up by the enthusiasm and the conscientiousness of the individual operator, irrespective of the person for whom the operation is performed, or irrespective of the fee which is charged.

If we cannot do the work so we have a self-consciousness that it is well done and to the best of our ability, I believe it is better for us not to do it, or to send the patient to some other operator; but I think on taking this point into consideration, and considering the man behind the instruments, depends largely our failure or success as operators.

One point I believe has not been touched on. I
Dr. C. L. Boyd, have seen fillings in mouths from good dentists—
Alabama. men who had done good work for patients and for this particular patient they would fail entirely, because they could not properly manipulate the material in that case.

My idea is that we all at times fail to adapt the material closely at certain points, whereas at the cervical margin and at the finishing up at the grinding surface, we adapt it perfectly and get better results. Dentists often lose fillings more through the leakage half way from the cervical margin to the grinding surface than from defects at the cervical margin.

After listening to the discussion where the doctor advises the younger men to take lesson from the
Dr. W. Kassab, older ones, it brought to my mind the thought of my
Chester, Pa. own work, and whether it will stand a test of thirty years. I do not expect some of the fillings to last that long. I expect some of the amalgam fillings to last, and some of the gold ones to last well. Am I doing inferior work, or have I not the same principles that the older men have? Is it that the percentage of their fillings that lasted that long is greater than mine? I would like to satisfy my conscience on that point. How many have lasted that long?

Then again, we seem to consider every method that we do regardless of the feelings of our patients. For some we can do work that will last thirty to sixty years probably, while with others—sensitive patients—I myself feel I cannot make fillings last so long.

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**Dr. Ambler,
Cleveland.**

Upstairs in the education department in this building may be seen a human tooth which has three fillings in it, made of tinfoil, and the tooth was worn in the mouth for thirty years. There is no decay around it. A gentleman who is sitting on the stage now showed me a tin filling which had done good service for forty years. Dr. Bogue, of New York, gave me the record of a well authenticated case with which he was familiar, and the tooth he had kept track of had been filled for sixty years with tinfoil, and there was no caries around the filling.

**Dr. Daniels,
San Francisco, Cal.**

I have been privileged to be associated with Dr. Platt for several years, and have seen much of his work, and it is a credit to him and to his profession. It seems to me there is one very important phase of the subject which we have failed to recognize. We often use our utmost skill and ability and the very best material which in our judgment will save the tooth; but we do not have the co-operation of the patient. Many patients hinder us; they have not enough confidence perhaps in our ability to perform the operation, or in some way they impede our progress and they render that filling a failure many times.

**Dr. Sylvester Moyer,
Galt, Ontario.**

Some one said success in life means to do one's best. I think in dentistry three things are necessary for success: 1, Dental education; 2, Manipulative skill; 3, Conscience. With those three equipments a man will be a success, for he will do his best.

I believe the success of the old gentlemen we have heard from today is due to conscience, conscience, conscience, and besides manipulative skill resulting from years of careful work, and all the education they could get standing back of it.

Dr. Whitney.

Some of the gentlemen who heard a paper I read before the California State Society will remember a statement I made—the paper being on the subject of gold against amalgam. I took my record books, which had been carefully kept for years, put them into the hands of an expert bookkeeper, so that the personal equation should be entirely eliminated, and asked him to take twenty-one patients at random that I had had the care of during all those years, and follow each filling through the twenty-one years and give me a statement. Perhaps some of the gentlemen remember the statement he gave me. It was that a little less than five per cent of the gold fillings had been replaced in those twenty-one years.

Dr. Stockton.

I cannot let my friend Whitney get ahead of me in speaking twice. It is the environment of the filling that has to do with its success. You have heard,



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perhaps, of an experience of old Dr. Waters, of Boston. A young man came into his office and asked him to examine his teeth. He did so, and made this remark: "Your teeth are not fit to be touched with a pair of tongs." The patient was dismissed. A few years after that a gentleman presented himself to Dr. Waters to have his teeth examined. The doctor carefully examined them, and said: "There is nothing the matter with your teeth. It is as fine a set of teeth as I ever saw. The care is simply marvelous." The gentleman asked: "Did you never see my teeth before?" "No, sir." "Are you sure?" "I am very sure of it. I never saw so fine a set of teeth." Then the gentleman said: "Have you forgotten when you said to me a few years ago that my teeth were not fit to be touched with a pair of tongs? That was a lesson to me, and I have since taken care of my teeth as I should."

People come to you and say a filling has come out. Is it a wonder with the care they take of them?

One of the finest things made by the hand of our Creator is the teeth, so shaped as to avoid decay and destruction. Yet they do decay. I say to my patients sometimes, when they come back and speak unkindly, perhaps, of the failure of fillings: "Do you complain of the Creator who made your teeth? I did the best I could, but I only patched them, and if you had taken half the care of what your Creator did for you that you should, your teeth would have been saved." Impress your patients with the idea that they may better throw their money into the street, unless they make up their minds to take care of the work that you put into their mouths.

As this subject is one I feel the greatest interest in, I want to say to you that I have been around and looked carefully over everything in the clinics, especially at the making of the gold fillings.

Dr. Corydon Palmer,
Warren, Ohio.

According to my long experience and observation, and what I have tried sometimes to teach, I find that there ought to be a reform in the manner of introducing gold into the teeth, especially the incisor teeth. I see them introducing the gold with a single round point, a straight instrument working in that direction, carrying it on without making any lateral condensation.

I have been accused sometimes of being dogmatic, but I will say in all kindness that I wish they would get in the way of using proper instruments to introduce gold with, and begin at the bottom, and do it so they can shift the instrument to one angle and another of the cavity, carrying the gold into the undercuttings and against the labial wall, where it is liable to show and be defective, and do the work up nice and fine, and not operate with an instrument seven inches long that stands off from the

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work, and have some one else mallet for you who does not see what you are doing.

I want to ask you to get into the habit of shifting your instruments across the filling and carrying the gold into the labial parts, which is passed over by introducing the gold with a single point and driving all in one direction. You must get some flat serrated instruments so you can condense laterally on the work, and do not get away from the cervical border before you smooth it down nicely so you will not have to go back to it.

The gold is not well condensed by carrying it in one direction. It should be condensed laterally as well as vertically.

I use short instruments. Get right down to it like an artist and try to do a fine thing. Do not get into the way of making a mass of stuff in a cavity, cement or tin foil at the bottom, and then non-cohesive gold on top, and then cohesive gold on top of that. If you put soft foil in a cavity and do not take very much pains to condense it, and then undertake to put the cohesive gold on top of that, it is not a good thing. The foundation is not right. I would like you to make a nice clean foundation. You need not take the most cohesive kind that will harden too quickly. Lay it across the cervical border, for that is where failure generally comes. Burnish it down so you will know it is right, and then go ahead.

Dr. Palmer has been in practice since 1839. I

The President. beg the audience to rise to their feet, as a token of respect to this aged practitioner.

The audience did so unanimously.

Subject passed.

Dr. Ottolengui read a paper by Dr. Garrett
Dr. Newkirk's Paper. Newkirk, of Los Angeles, Cal., entitled: "The Whole Question of Matrices and Their Uses." An abstract follows:

Dr. Newkirk highly recommended the Ivory separator, and condemned any continuous band matrix, arguing that a matrix should be so constructed as to pass between the gum and the cervical margin of the cavity at the first adaptation, and not be allowed to rest on the gum to be subsequently pressed into position by wedges.

He also recommended that in many instances the cervical third of the filling should be inserted without the matrix, and the matrix used subsequently.

He further recommended for many cases where the dam could not be applied, the use of hand matrices, which he says can be made from any old spatula, the blade being hammered very thin after removing the



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temper. These are particularly applicable where the material to be inserted is gutta-percha, which he states might better be put in in its proper form at the outset, than placed in in excessive quantity and trimmed down.

Discussion on Dr. Newkirk's Paper.

Dr. Whitney,
Honolulu.

As to the question of matrices, I have been greatly interested in it, and have for many years been a constant user of the matrix in connection to gold.

In this Dr. Newkirk and myself differ widely. In my own practice I cannot admit that a filling cannot be put in with equal adaptation to the borders with a matrix properly adjusted, as without. I think this greatly depends upon how you prepare your cavity. If you prepare it intelligently with the matrix before you, you will prepare it quite differently than you would otherwise. You cannot do good work, in my estimation, if you make your borders square, and you do not give them the proper cutting away. You must bevel, and instead of using a large-pointed or square-pointed instrument, it seems to me no filling with the matrix would be properly placed without using the round plugger. I use the Royce plugger.

Dr. H. W. Arthur,
Pittsburgh, Pa.

I have been looking for this paper, because I have some experience in using amalgam. Probably most of us have our favorite instruments, and we have with them greater success. The paper specified so strongly that everyone of us will want to see the instrument that the essayist refers to. I think the object of the matrix is first to secure absolute contact at the cervical border. Some want the matrix free at that point, so they can fill over and trim. I think it should fit exactly at the cervical border, so much so that it will require little more than the use of the strip. The most simple form of matrix is the piece of steel, so applied that it will not impinge either on the lingual or buccal side.

Dr.
H. F. Herriman, Jr.,
Oakland.

Each individual case suggests its own mode of procedure. There are cases where when non-cohesive gold is used at the cervical border, it is better to allow a slight yielding of the matrix, so that when the matrix is removed you have an opportunity to thoroughly burnish this non-cohesive gold around the borders of the cavity.

A great many of the operators cannot understand how we seal the margin of our cavities in this manner. I believe the reason is with the class of instruments which they employ in the ordinary condensation of cohesive gold. The principal idea in the placing of the gold after the layers of non-cohesive gold or cohesive gold are employed, is the manner in which you apply your plugger. It must be in the direction in

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which you wish the force to go—toward the margin of the cavity, and the enamel walls, and toward the matrix as well. Take, for instance, a piece of iron that the blacksmith will weld; he does not hammer here a little and there a little, and then go back; he draws his iron or steel and forges it in front of him toward the periphery of his work. You should begin at the center of your work, forging your gold in the direction you wish it to go. Your matrix constitutes one of your principal walls; forge it in that direction as well.

**Dr. W. Kassab,
Chester, Pa.**

I would like to speak more in reference to fillings made with amalgam. About three years ago I had an amalgam filling placed in a lower tooth, on the approximal surface. I thought instead of having one wedge, why not have two wedges? One of the Ivory separators has two fingers; I placed that between the matrix and the opposite tooth, and wedged it a little, and I have come across nothing that has answered my purpose so well. You will say it hurts; it does, but if you explain to the patient that you can get a much better filling in that way with a steady pressure, the patient does not mind the pain.

**Dr. John T. Hart,
New York.**

The instrument described by Dr. Whitney has been also suggested by Dr. Dickinson, and having used that instrument, I think it but right to call the attention of this body to it, as I have found it overcomes so many of the objections which are spoken of in the use of a matrix. The Dickinson instrument wedges the tooth to be filled to quite an extent, so that it provides for the proper and suitable kunckling of the filling against the tooth immediately next to the one that is filled.

There is little, if any, pain in the placing of the matrix, and it holds the same in firm contact to the tooth that is being filled. The essayist suggested not screwing the matrix at the start as tight as he does later in the operation, and it is the only point that I found to criticise in the paper. If there is any time when we should have the matrix in close proximity with the tooth to be filled, it is at the time we are filling the cervical portion of the cavity. I think after that there may be no objection in slightly relaxing the pressure, but at the start of the filling I think the matrix should be placed as firmly as possible.

This subject is not complete without referring to the matrix suggested by Dr. Hodson, of New York City, which permits of the knuckling of the filling as possibly no other matrix will do. It is simple in construction. It consists of a strip of thin steel from which the temper is removed, and while in this soft state, it is struck a few times on a lead plate with a rounded, smooth instrument. Then two holes are punched in, the edges are smoothed, and the matrix placed in position. If there



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is an antagonizing tooth, it is held firmly; but if it is not as tight as we wish, it can be fastened with a wedge or separator. This permits the fashioning or shaping of a matrix for every operation.

I would like to explain a little wedge I use. I take a piece of steel about 30 gauge, of which we make the matrix. I cut it about two lines in width, and bend it into a V shape. With this I wedge the matrix, one side striking the adjoining tooth. In different teeth you would use different thicknesses of steel.

The subject was then passed.

A paper by Dr. Arthur Scheurer, of Teplitz, Austria, was then read by the secretary. The paper is entitled: "Tin Cement and Sponge Tin." The following is an abstract:

Tin Cement and Sponge Tin, by Dr. Arthur Scheurer.

Sponge Tin. This material is obtained from a solution of stannum bichloratum—chloride of tin—by precipitation with zinc. The substances employed must naturally be chemically pure, and the precipitated sponge tin must be washed with running water until when tested with blue litmus paper, no trace of acidity is perceptible.

Sponge tin may be condensed between the finger tips, and naturally much more readily when packed into a cavity by means of a Solila or Royce packer. It is of invaluable assistance in gold filling, since it may be mechanically united with—mechanically welded to any brand of unannealed sponge gold whatever.

Into the cavity which need have no undercuts, I carelessly pack sponge tin nearly to the margin; it is quite the same whether with hand pressure or the automatic mallet. Upon this I put a layer of unannealed sponge gold—Watts or Solila—then a layer of annealed sponge gold, and finish with annealed gold foil or cylinders.

My further experiments have yielded the fact
Tin in Cement. that a tin powder obtained from sponge tin, when mixed with zinc oxide, produces a cement powder with certain qualities that render it of inestimable value in its application to dentistry.

This powder is of a light grayish color, with here and there the shimmer of a fine particle of metallic tin, and may be mixed with any good cement liquid, producing a cement with far greater adhesive properties than that of the ordinary cement powder alone. This may be read-

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ily seen from the fact that the ordinary cement, when it has hardened upon a metal spatula, can be removed with comparative ease; whereas, in the case of tin cement, it is accomplished only with the greatest difficulty.

Tin cement is also quite remarkable for its hardness, as well as for its resistance to the wear due to attrition, and to the attack of an acid saliva.

Since the surface presented is practically all metal its resistance to wear and to the attack of saliva is readily accounted for. Tin cement fillings neither lose their own color nor do they discolor the tooth, consequently the usefulness of this material is considerably extended.

Discussion on Dr. Scheurer's Paper.

In view of the fact that the essayist sent no
Dr. W. U. B. Ames, specimens, I will send around a bottle containing just
Chicago. such precipitated tin as he describes in his paper.

He describes the tin as precipitated in a galvanic way by the insertion of zinc, to a powder of various grades, from a fine dust up to crystals. You will see the coarseness of certain particles that accumulate at the top, and at the bottom you will see the fine dust. In the mixture of such tin with the powder of oxyphosphate, the coarser crystals, being of very thin laminae, would break into a fine powder.

On being asked to discuss this paper before seeing it, I inferred from part of the title—"Tin Cement"—that the doctor had discovered some means of producing an oxyphosphate from oxide of tin. I was rather startled, because I had gone through, I thought, all the experiment possible with oxide of tin, without getting any results. We have experimented many times in the mixing of such materials as he has precipitated tin with oxyphosphate, for this purpose, all the way from amalgam fillings or turnings to the metallic precipitate. For some years I have been talking about the mixture of precipitated metals with oxyphosphate and the precipitated silver, and I have used this tin, such as you see, with promising results, although I must say that from experiments out of the mouth, and the general behavior of the material, I settled down in my own work to making fillings of a mixture of precipitated silver and oxyphosphate, the silver being in much the same form. I have seen excellent results from that, although I am inclined to believe there is something peculiar about the behavior of tin in connection with cement, especially if you should adopt the plan of making a filling of this so-called tin cement, and covering it with gold.

Dr. Shumway, of Plymouth, Mass., told me once he secured remarkable results, which were unaccountable to him, when placing a thin veneer



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of cement over a tin filling, often filling the cavity in an incisor, cuspid or other conspicuous tooth nearly full of tin, and placing a thin veneer of cement over it. He said it would last immeasurably longer over that tin than as a plain cement filling. I furnished Dr. Shumway, at that time, some of this particular precipitate of tin to further carry out his work in that line.

The advantage is from various sources, as I look at it. We often attempt to increase or strengthen the resistant power of cement by the incorporation of foreign materials, and often it is a failure from the nature of the material used. Just as in the use of a metal, a filing or turning will not give you the result that a feathery precipitate will give. It will be so distributed in the mass of cement, that you have practically a metallic surface. If on the exposed surface the cement wears slightly, it will be a wearing of the cement from around the particles of metal, and the metal will have a tendency to spread, especially if there is an occlusion of the opposite tooth on it. You will have practically a metallic surface.

In the incorporation of such foreign bodies, a great deal depends upon the nature of the foreign substances. The sponge tin I do not care to discuss.

In this connection, although it is foreign to the subject, I wish to speak of what can be accomplished by the admixture of other materials than the precipitated metals. A sufficient excuse for that will be that these mixtures do not have a satisfactory color for the anterior teeth. While we could use these combinations to advantage in the posterior teeth, we must look to something else for the conspicuous surfaces.

Here again the nature of the crystal or particle of the foreign material comes into play. I have gotten a great deal of satisfaction from seeing the good results of my first experiments from the admixture of such materials as properly precipitated aluminum or the porcelain powders as we get them, and from the fact of having available the porcelain powders of desirable colors, we have a material which we can use to greatest advantage for these purposes.

After four years of observation of fillings, in which a large amount of pulverized porcelain was incorporated with oxyphosphate of zinc, I would say that results have been brought about which were out of all proportion from that which may be expected.

To put it in the shortest way, it has been my experience that a cement filling on the occlusal surface of a molar or bicuspid will last several times as long and be intact and protect the tooth as upon an approximal surface of an incisor or bicuspid.

Mixing Porcelain with Cement.

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After waiting for four years and over, I find that I have made fillings which are practically good and practically perfect to-day, which, if made of plain oxyphosphate, would have needed renewal some time since. The theory, as near as I can advance it, is that after having used about equal bulks of porcelain body and cement powder in the mix of cement—the particles of porcelain are so near together that the layer of cement between them is like a fine inlay joint, and the cement does not seem to waste to the depth of the layer of the porcelain particles.

In a short time we have a surface which is apparently of porcelain, and resembling a hand-packed porcelain inlay; in other words, biscuited porcelain. It has much the appearance of a porcelain inlay. I have often been deceived in some cases, having forgotten certain fillings, and having to go to my book to see what I had done.

I want to ask Dr. Ames a question or two in regard to incorporating the porcelain in the cement.

Dr. R. C. Turner,
Kansas. What proportions of the porcelain would he incorporate in the cement to bring about the effect he has found in the wearing or resisting properties of the oxyphosphate of zinc?

I hope that statement will not switch the discussion entirely from the paper on tin cement, because there is a great deal of value in it. I do not claim to have worked this out to a nicety as to proportions. I put as much porcelain into this mixture of cement as I think will hold it properly together. I have settled down latterly to an attempt to incorporate about equal bulk of porcelain with the cement. I try to get as much as can be incorporated. Mix it just as stiff as you can. When you can no longer spatulate, rub and knead it in well.

My experience has been that the mixture of any foreign body in a cement weakens it. As for mixing porcelain with cement, I cannot see that that would be much different from the mixture of glass and cement. Of course they are closely allied chemically, and experiments along this line have been carried to quite an extent, and have been abandoned. We are going back to the old experiments, and I would like to know why the mixture of cement and porcelain would be any different. I have made mixtures of alloys of different kinds, and my experience is that whatever I mix with cement weakens it.

I started to make these experiments with a great deal of doubt as to the outcome, because it had been my experience that all foreign substances weakened



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the cement. It is in print, and in a booklet I issued, that that had been my experience. In making these experiments, I did not expect the results I obtained. You do not have a mass that is as resistant to cutting or grinding as a plain mass of cement. I would not expect in all classes of cavities in the posterior teeth, as good a result as with a plain cement, because of the effect upon a granular surface rather than upon a smooth and polished surface of the excretions of food. We have conditions under which we have putrefaction and fermentation and stagnation of fluids—stagnation which allows of these processes. We want something more resistant than a plain oxyphosphate of zinc surface, and in these cases of which I speak, there is practically a porcelain surface presented which cannot be acted on by the products of fermentation and putrefaction.

Strictly speaking, it is not a tin cement. That is
Dr. Ambler, a misnomer; but after the paper was read, we know
Cleveland, O. what he meant. Allusion has been made to gold and tin also.

In 1825, Ash, of London, made an extended number of experiments in trying to produce crystal or graulated or fibrous gold. Some of his product was put on the market. It was a failure both as a commercial product, and as a filling material.

In 1850, Dr. S. A. Main, of Buffalo, N. Y., having read of these experiments, thought he could make some better; so he commenced his experiments in trying to produce a crystal or granulated or precipitated gold. His experiments did not meet with success,, either commercially or in the hands of the dentist.

Two years after that, Dr. Watts, who, by the way, was not a dentist as most of the dentists think, but a photographer—discovered the method of making Watts's Crystal Gold, which was put on the market, and with some changes is still in use at the present time. As a commercial product, it has been just modestly successful, and as a product for filling teeth, it has been moderately successful.

Since that time, several other gentlemen have been trying to make different precipitates and crystals and fibrous golds of different kinds, which have not been a great success commercially nor in the hands of the dentist.

Now if all of these different products of gold that I have spoken of had been the best of anything that could possibly be made, why was it that from 1825 to 1904 the best operators in the world, at home and abroad, did not give up gold foil and take up these different products? Why did not Atkinson, Webb, Varney, Palmer and Johnson throw away gold foil and take up these products?

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Tin. Now as to the tin question. The method of producing a precipitate of tin or crystals of tin has been known ever since tin was discovered almost. If you take tin and dissolve it in hydrochloric acid, hot or cold, pour it in an equal quantity of distilled water, and set in a plate of zinc, your tin crystals will begin to form on the plate of zinc. Leave it until you get all you want. Scrape them off with a spatula of ivory or wood. That was done years ago, but I want to tell you today that that kind of product is being put on the market now as something new and wonderful to fill teeth with.

Tin has also been put on the market in the form of shreds. A machine was put on the market for that purpose. Taking a solid bar of tin, the machine shredded it up into fine round wires like hair.

Another form that has just come out in imitation of that—an alloy—tears it into shreds and fibers. All those different kinds of tin stand in the same relation to tin foil that all those preparations of gold stand in relation to gold foil. If those preparations were better than tin foil, why was it that S. B. Palmer and Corydon Palmer, and all those men did not throw away foil and use them? In 1856 Dr. Taft published in the *Dental Register* in the West, the same thing. There is no question but that the mixing of some kind of metal filings or precipitates with different kinds of cement as has been well referred to does add as a general rule to the life of fillings on occlusal surfaces, unless it is the cement Dr. Ames speaks of where you incorporate the porcelain body. I have had no experience with that.

We know that cement is a poor conductor of thermal changes, and a poor conductor of electricity, and tin is a poor conductor. If we put tin and cement into a cavity where the pulp may possibly be almost exposed, we put in a good non-conductor.

I am from the past; and in those days we had
Dr. Corydon Palmer, Abbey's non-cohesive gold—it is the only one I
Warren, Ohio. knew anything about. We also had Abbey's
 chemically pure tin foil. I used it until we got
 something we liked better. All that is done to make it chemically pure is a
 damage to it—it is not a nice, clean surface. Don't do any corrugating
 or anything, but get a good, clean, pure tin foil that has not been tampered
 with and make a good filling of that. That is the best thing you can do
 with it.

Dr. Hunt. I want to say a word in regard to the use of ad-
 mixtures of metals with cement, and a word in
 regard to the mixture of amalgam and cement. If it is rubbed in and con-
 tinued long enough, the amalgam goes to a powder. If that is done, and
 the powder mixed with the oxide of zinc, and the mixture made with the





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cement fluid in the usual manner, the result is a hard and resistant mass, but not a very beautiful one. The color is not good—it is rather dark; but it stands the wear of attrition excellently, and does not wash out in the fluids of the mouth as much as though the powder had not been incorporated with the alloy.

Dr. Whitney. I have been practically using that method for some years, but I have not found that it has weakened my cement, but rather that it strengthened it.

Sometimes where cement has given way, I have removed it, and replaced it with this mixture, and find it outwears the other.

**Dr. Taylor,
Sacramento, Cal.**

I just want to state that one particular point I noticed in the use of it, is that there seems to be little recurrence of decay where the combination is used.

Where you have a filling of this character, placed on the occlusal surface of a tooth, the attrition seems to bring the granules or the pigment of the amalgam in juxtaposition you might say, and seems to form a metallic surface. The cement that is incorporated in the mixture is hardly noticeable. The point I wanted to bring out especially was the non-recurrence of decay.

The subject was passed.

Dr. Ambler moved that Dr. Losada's paper on the subject of preparation of cavities, be read by title and published in the transactions.

Dr. Johnson.

As chairman, I want to express my thanks to the committee in this section on Operative Dentistry, for the support they have given me in the preparation of the programme for these sessions. I also want to express my thanks to the secretaries of the section who helped us out, and the stenographer for the assistance he has given us. Above all, I want to thank the members of the section for their attendance and their close attention. It has been whispered about that we have had the very best attendance at this section of any at the Congress, and I, as chairman, appreciate that and wish to thank those who have come here regularly.

A vote of thanks was tendered to Dr. Johnson for the business-like way in which he managed the affairs of the Section.

Adjournment.



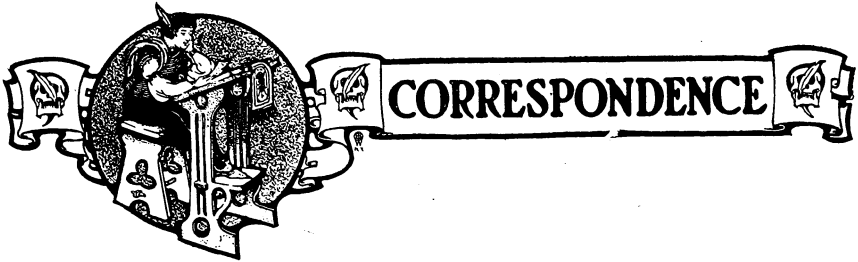


In our last issue we promised our readers "the cream" of the Congress proceedings. This brought forth a mild protest from the editor of the *Dental Cosmos*, who wittily asked if it was our intention to leave him only the skimmed milk.

We regret exceedingly the use of the term, which to say the least was indiscreet. It was never our intention to transgress the ethics of dental journalism, and we well understood that the publishers of the *Dental Cosmos*, by contract, obtained the right to publish the proceedings of the Congress. Under the rules, therefore, we are permitted to give only abstracts from a few of the papers, and such parts of the discussions as in our opinion might interest our readers, the same having been procured by our own stenographer.

The report which we offer, under these conditions, has an interesting aspect, as being a fair representation of what one man was enabled to extract from the Congress, and if many valuable papers are not even alluded to in our pages, this fact but adds to the argument against the conducting of large meetings by the section system.





Editor ITEMS OF INTEREST:

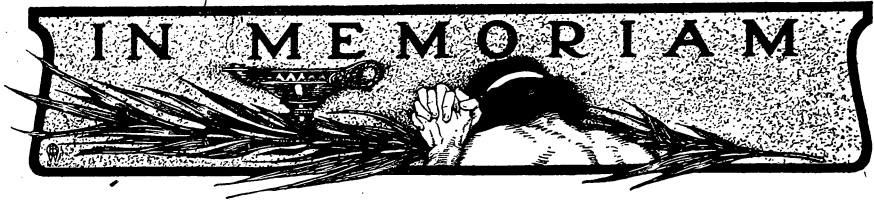
I wish to kindly call your attention to the paragraph introducing the description of my clinic which appears in the October issue of the *ITEMS OF INTEREST*. To those unfamiliar with the work it gives the impression that I claim to have something new and entirely original, while those who are familiar with it may accuse me of doing that which I had no right to do.

The credit for the origin of this crown belongs to Dr. C. H. Land, and while others may not follow the exact methods he teaches, the results are the same and the value of the work depends entirely upon the ability of the person producing it.

Very truly yours,

J. M. THOMPSON.





Dr. Jonathan Taft.

Resolutions passed by the Northern Ohio Dental Association.

WHEREAS: In the death of Dr. Jonathan Taft, which occurred at Ann Arbor, Michigan, October 15, 1903, the dental profession has lost a most valuable member; one who gave generously of his knowledge for the advancement of his ideals; a noble manhood, ideal operations and faithful services; a man, unselfish, gifted, kind and true, using his God-given talents for a noble purpose—serving man; and one whose fidelity and Christian character must ever be an example to the coming generations of an ideal dentist,

Be it resolved, That we, his followers and members of the Northern Ohio Dental Association, in annual convention assembled at Cleveland, June 7 and 9, 1904, express and record our appreciation of his noble life and generous contributions to the dental profession; and urge upon every member to live the life this gifted man lived, in order to bring to pass his conception of an ideal dental profession.

C. R. BUTLER,
CORYDON PALMER,
F. S. WHITSLER,
Committee.

C. D. PECK, Recording Secretary.

Dr. O. W. Staples.

It will be a cause for very deep regret on the part of many especially in Massachusetts to learn of the death of Dr. O. W. Staples, after an illness of little over a month from tuberculosis. He had just been settled in practice for two months in Somerville, Mass., when he was forced to suspend work and return to his home in New Brunswick, but the disease progressed so rapidly that death ensued at Fredericton on July 31st, only forty-five days after the symptoms were manifest. Dr. Staples's course at Tufts Dental School where he graduated in 1903 was crowned with the highest success, and his future was counted as one of certain bril-





liancy. The first year after graduating had been spent associated with his uncle, Dr. Barbour, of Fredericton. Dr. Staples' birthplace was St. John, N. B., being but twenty-two years of age at his death. He was unmarried.

Dr. Marshall D. Nisbet.

Dr. Marshall D. Nisbet died at the St. Joseph Hospital, at Sioux City, Ia., August 13, 1904, from cardiac embolism, after a successful operation for gall stones.

Dr. Marshall D. Nisbet was born in Mitchell County, Ia., September 8, 1868. In his early life his parents removed to South Dakota, and there he grew to manhood. After following various occupations during these years, he had accumulated a sufficient amount to put himself through college, so he took up the study of dentistry in 1898 at the Northwestern University Dental School, Chicago, Ill. The second year in college he was made vice-president of his class, and the third year was elected president. He graduated in 1901 with highest honors.

He had a successful practice established in Chicago when he left there and came to Sioux City, Ia. Here he entered into partnership with Dr. Arthur S. Wasson in November, 1901, and had already built up a large and lucrative practice.

He was a member of the Iowa State Dental Society and the Sioux City Dental Association.

He leaves a widow and one child.

At a special meeting of the Sioux City Dental Association on August 16, 1904, the following resolutions were adopted:

WHEREAS, The natural course of events has removed from this life Dr. Marshall D. Nisbet, who passed to the Great Beyond August 13, 1904, and

WHEREAS, The dental profession recognizes the benefits received through his having lived, and by his life given us an example of a true and courteous professional gentleman, therefore be it

RESOLVED, That in the death of Dr. Nisbet our profession has lost a man of sterling worth, whose progress in the profession was a source of pride to his colleagues, and from whose example all hope to profit; also

RESOLVED, That we condole with his bereaved family, and a copy of these resolutions be sent his widow, the dental journals, the Sioux City daily papers and also be inscribed on our official records.

ARTHUR SOLVSBERG, A. S. WASSON, T. A. ROSE,
Committee.



SOCIETY ANNOUNCEMENTS

State Society Meetings.

Delaware State Dental Society, Dec. 7, 1904.

Illinois State Dental Society, Moline, May 9, 10,
11, 1905.

Montana State Dental Society, Butte, Feb. 20,
21, 1905.

Ohio State Dental Society, Columbus, O., Dec.
6, 7, 8.

Wisconsin State Dental Society, Oshkosh, July, 1905.

First District Dental Society, New York.

The First District Dental Society of the State of New York will hold a clinic and exhibit at the Grand Central Palace, Forty-third street and Lexington avenue, New York City, on Monday and Tuesday, December 12 and 13, 1904. The dental profession is cordially invited.

There will be a large and interesting program, to which the Clinic Committee would like to add the name of every ethical practitioner desiring to participate. Exhibitors desiring space kindly communicate with Dr. Goldsmith.

Two evening meetings, on the 12th and 13th, will be held at the Academy of Medicine, No. 17 West Forty-third street, at which papers will be read by Dr. G. V. Black on "Extension for Prevention," and by Dr. E. K. Wedelstaedt on "The Packing of Gold in Approximo-Occlusal Cavities in Molars and Bicuspid," demonstrating his method with clay in large wooden models. Dr. Black will present something entirely new of great interest.



ITEMS OF INTEREST

The Second District Dental Society, the Central Dental Association of New Jersey, and the New York Odontological Society have been invited to attend these meetings.

S. L. GOLDSMITH,
Chairman Clin. Com., 129 East 60th Street.
F. L. FOSSUME,
Chairman Ex. Com., 616 Madison Avenue.

Fifth District Society of the State of New York, Jefferson County Dental Society.

A union meeting of the Fifth District and the Jefferson County Dental Societies will be held at Watertown, N. Y., November 14 and 15, 1904. An attractive programme is being arranged. Dr. E. C. Kirk and Dr. F. A. Peeso, of Philadelphia, will be in attendance. Dentists of northern and central New York are invited to be present.

E. E. HARRINGTON, Secy.

Jefferson County Dental Society.

National Association of Dental Examiners.

Officers.

President, Thomas J. Barrett, D.D.S., Worcester, Mass.; vice-president from the West, Frank E. Moody, D.D.S., Minneapolis, Minn.; vice-president from the South, F. A. Shotwell, D.D.S., Rogersville, Tenn.; vice-president from the East, C. Stanley Smith, D.D.S., Cincinnati, Ohio; secretary and treasurer, Charles A. Meeker, D.D.S., 29 Fulton street, Newark N. J. Committee on Colleges—Charles C. Chittenden, D.D.S., Madison, Wis.; J. A. Hall, D.D.S., Collinsville, Ala.; James G. Reid, D.D.S., Chicago, Ill. Conference Committee—John F. Dowsley, D.D.S., Boston, Mass.; Charles S. Stockton, D.D.S., Newark, N. J.; H. W. Campbell, D.D.A., Suffolk, Va.

National Dental Association.

Officers.

President, Dr. Waldo E. Boardman, Boston, Mass.; vice-president from the East, Dr. John I. Hart, New York, N. Y.; vice-president from the South, Dr. R. K. Luckey, Holly Springs, Miss.; vice-president from the West; Dr. Wm. Conrad, St. Louis, Mo. Executive Committee—Same.



Delaware State Dental Society.

The Delaware State Dental Society will hold a regular meeting on Wednesday, December 7.
Wilmington, Del. R. H. JONES, Secy.

Fifth District Dental Society of the State of New York.

The semi-annual meeting of the Fifth District Dental Society will be held in Odd Fellows Temple, Watertown, on Monday and Tuesday, November 14 and 15, 1904.
Rome, N. Y. E. A. SMITH, Secy.

Mississippi Dental Association.

At the last meeting of the Mississippi Dental Association, the following officers were elected: L. G. Nisbet, Aberdeen, president; W. H. Reaben, McComb City, first vice-president; J. E. Frazier, Canton, second vice-president; E. N. Bigham, Pontotoc, secretary; L. B. McLaurin, Fayette, corresponding secretary; C. C. Crowder, Kosusko, treasurer.
E. N. BINGHAM, Secy.

New York State Dental Society.

At the last meeting of the New York State Dental Society, the following officers were elected: President, Wm. Jarvie, Brooklyn, N. Y.; vice-president, W. A. White, Phelps, N. Y.; secretary, Wm. C. Deane, New York City, N. Y.; treasurer, C. W. Stanton, Buffalo, N. Y.; correspondent, Ellison Hillyer, Brooklyn, N. Y.

W. C. DEANE, Secy.

Harvard Dental Alumni Association.

At the thirty-third annual meeting of the above society, the following officers were elected: President, Harry S. Parson, '92, Boston, Mass.; vice-president, Ned A. Stanley, '84, New Bedford, Mass.; secretary, Waldo E. Boardman, '86, Boston, Mass.; treasurer, Harold De W. Cross, '96, Nashua, N. H. Executive Coinmittee: Waldo E. Boardman, chairman ex officio; Samuel E. Elliott, '01 for one year, Boston, Mass.; Walter A. Davis, '01, for two years, Boston, Mass. The Council is composed of the above named officers.
WALDO E. BOARDMAN, Secy.





Bayonne Dental Society.

The dentists of Bayonne, N. J., met at the office of Dr. V. E. Mitchell on Thursday evening, September 8, and organized the Bayonne Dental Society, electing the following officers: V. E. Mitchell, D.D.S., president; T. H. Reynolds, D.D.S., vice-president; G. W. Mellor, D.D.S., treasurer; W. H. Mitchell, D.D.S., curator; A. M. Vannatta, D.D.S., recording secretary; A. C. Smith, D.D.S., corresponding secretary; J. S. Ware, D.D.S., financial secretary. The society will meet the first Friday evening in each month.

A. C. SMITH, Cor. Secy.

85 West Fifth Street, Bayonne, N. J.

Arkansas State Board of Dental Examiners.

The next meeting of the Arkansas State Board of Dental Examiners will be held December 2 and 3, 1904, in Little Rock, Ark., for the examination of all applicants. Those having applied for examination will report to the secretary Friday morning, December 2, 1904, with rubber dam, gold, plastic filling material, and instruments, to demonstrate their skill in operative dentistry. Anyone who wishes may bring his patient; so far as possible patients will be furnished. The board reserves the right to select the cavity to be filled. The examination will cover all branches of the dental profession. No temporary certificates issued to anyone. Examination fee, \$5.00. For further information write the secretary.

DR. A. T. McMILLIN, Secy.

South Dakota State Board of Dental Examiners.

The South Dakota State Board of Dental Examiners will hold its next regular session for the examination of candidates at Sioux Falls, S. D., Tuesday, December 6, beginning at 1:30 p. m. All candidates will be required to bring operating instruments, prepared to do all kinds of clinical operative work, also a bridge of not less than four teeth, including one Richmond and one gold shell crown invested ready to solder. All candidates must positively send their application to G. W. Collins, Secy., Vermillion, S. D., not later than December 2.

Yours truly,

G. W. COLLINS.

